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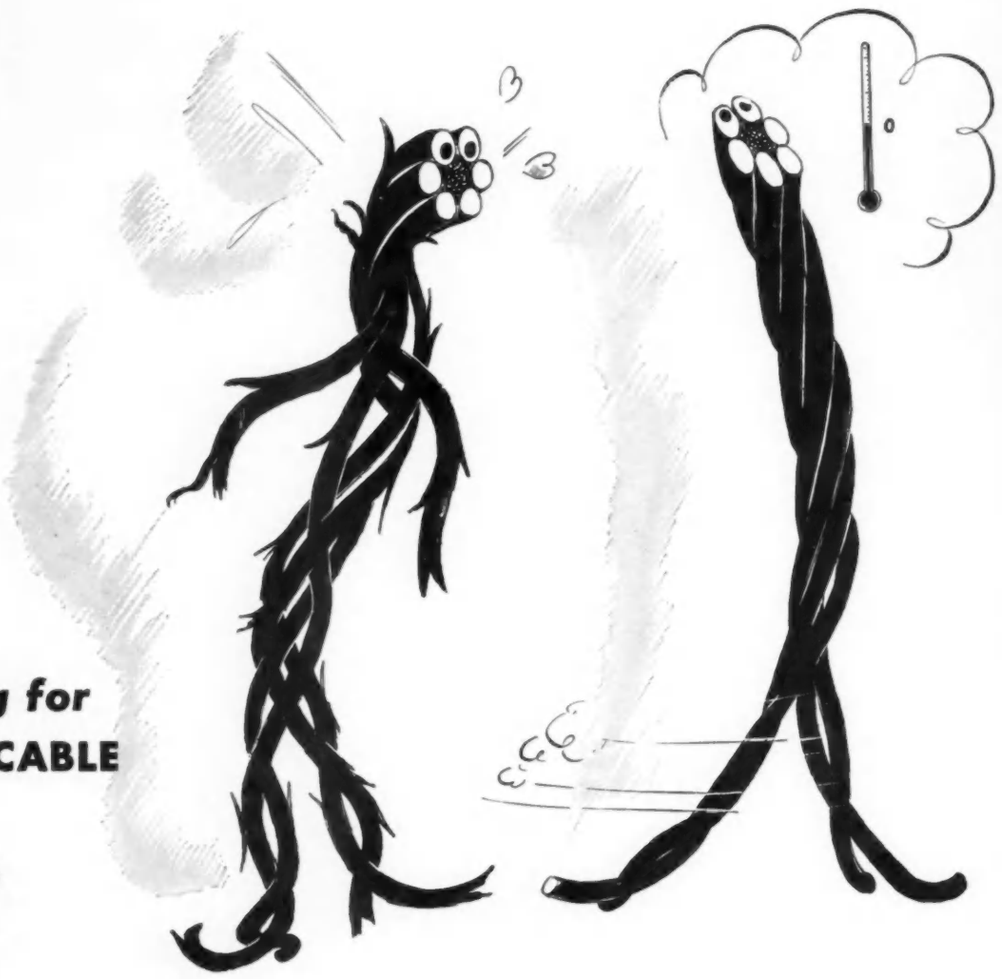

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LOOKING AHEAD
... with the Editor

A GLIMPSE into post-war transportation will be given next week, in an article discussing the effect of wartime development of transportation facilities on moving oil after the war. A good many opinions already given out are summarized, and the problem is also approached through improvement in transportation equipment. A good many of these technical achievements are still war secrets, but definite trends are clearly indicated by what can be told. Also, enough information has been accumulated from present activities to justify logical prediction of what is to come.

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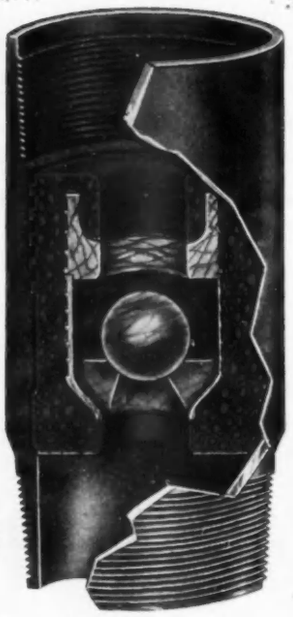

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The Changing Panorama

Fear of Government Control Growing

DESPITE the prospects of a critical shortage of crude oil itself during 1944, the problem of supply is being transcended in importance in the minds of oil men by the growing fear that the industry faces some form of highly centralized government control after the war. Rumors and speculations along these lines are heard every day now.

Disappointment at the failure of government bureaus to increase the price of crude oil, of course, is one reason for such belief. Other reasons include: the thought that the government is favoring foreign operations over domestic ones, and that some government men may actually be desirous of having a shortage in this country so as to have an excuse for regimenting the industry on a permanent basis; and the thought that some government men seek to put the government into the oil business through the recently created Petroleum Reserves Corporation, and plans for substitute petroleum plants.

This fear of government regimentation, of course, is a part of the general mistrust of government attitude toward business that has swept the country in recent months, and also is a part of the general opposition against subsidies that the government has proposed for several commodities.

These developments presage that the harmony between the oil business and the government, which has heretofore flourished in a manner satisfactory to both partners, might become a thing of the past with respect to at least some point. While embitterment against the way oil prices have been handled is directed against OPA, there is developing some mistrust of Petroleum Administrator Ickes with respect to his views on post-war regulations, foreign policies, substitute petroleum plants, and whether the government should go into the oil business.

Not Enough Supply For Products Line

NOW that the 20-inch product line from Texas to the East Coast is about completed, there is considerable speculation whether there will be sufficient tonnage available for the line to operate on at an efficient rate. Since construction was started, several developments have occurred that make it appear there is not enough products in sight for the line.

Stocks of refined products have been reduced sharply, and are at such low levels it is not desirable to withdraw the several million barrels required to fill the line. This phase might be overlooked were it not for the fact that the shipping picture has improved to such extent that output of Gulf Coast refineries is being moved as quickly as it becomes available. It was not foreseen that tanker movement would be as large as it has become recently. Another big factor is that the military does not want any large quantities tied up for the 10 days or two weeks that would be required for the oil to traverse through the line, instead military authorities want the oil where they can pick it up on short notice.

Looking back, it can be seen that it would have been wise to have increased crude productions and crude runs to stills in Gulf Coast refineries earlier in the year. This would have permitted the building up of stocks in the area. However, stocks seemed adequate at that time, in view of civilian rationing and with no one foreseeing the exceptionally sharp growth in military use.

Several PAW District 3 committees are studying the problem of supply for the products line, but so far as known have not worked out a solution.

More and Better Bits And Tool Joints

ROCK bit and tool joint production, which has been of serious concern, is on the upgrade. Present plans are for a considerable increase in the production of rock bits. This is necessary to take care of the increased drilling program in 1944. Tool joints now being produced are practically equal to peacetime production, and will shortly exceed previous quantities.

The use of National Emergency Steel in rock bits was a serious detriment to the drilling of oil wells, considerably more bits were necessary to drill a well, especially the deeper ones, than before the wartime use of such steel. The use of Series 8600 steel and 8740 steel in rock bits is now in the experimental stage and should considerably improve the present rock-bit situation. Alloy steels of these grades are now available.

Salt Water Injection Benefits East Texas

THE return of salt water to the sands in the East Texas oil field continues rising to new peak levels, thereby lowering the net amount of fluid withdrawn from the field, and this is having a very beneficial effect on the field's performance.

When the field's performance is analyzed from the standpoint of the amount of oil produced per pound loss in bottom-hole pressure, which is the most important point, it is found that more oil has been produced per pound pressure drop during the first 11 months of 1943 than in the past five years. This seems tangible evidence of the benefit of the salt-water-injection program.

The pressure production relationship for the past five years is shown in the following table:

Year	Oil Production in Barrels	Reservoir Pressure Loss in Lbs.	Oil Produced Per Pound Pressure Drop
1939	141,423,317	45.43	3,112,994
1940	139,094,581	9.62	14,458,890
1941	130,407,594	26.15	4,986,905
1942	120,738,216	9.87	12,232,840
1943 (11 Mos.)	117,019,201	7.71	15,177,580

The better record attained in 1943 has been made although daily production has averaged 350,357 barrels in comparison with 330,790 barrels in 1942. This appears to be due to the higher rate of returning water to the producing formation, which in effect has resulted in the amount of net fluid withdrawn being reduced, although oil production has increased. In January of this year, when oil production was only 325,000 barrels daily compared with the recent rate of approximately 375,000 barrels, total withdrawal of fluid amounted to 752,309 barrels, and net withdrawal after deducting the 102,059 barrels of water injected totaled 650,000 barrels daily. In recent months, total withdrawal of fluid has risen to over 800,000 barrels daily, but the higher rate of injecting salt water has cut the amount of net withdrawal to less than 600,000 barrels per day.

During November 278,658 barrels of salt water were injected daily, according to Texas Railroad Commission records, the highest volume in history. It is estimated that an average of 427,373 barrels of salt water were produced daily in the field during November.

Of the almost 280,000 barrels returned to the sands daily during November, the East Texas Salt Water Disposal Com-

pany injected 179,116 barrels daily and 10 operating companies injected the remaining 99,542 barrels.

The volume returned to the Woodbine sand by the cooperative disposal company has increased steadily, and on December 3 passed the 200,000-barrel mark. The first salt water injected by the company was but a little over a year ago, in October, 1942. In November, the company was operating 28 disposal systems which served 356 different leases on which were located 2000 oil wells making salt water. Since the beginning of its operations the company has returned 35 million barrels of salt water to the producing formation. Over 130 million barrels of salt water have been injected in the East Texas field since the first disposal system was started in 1938.

What Kind of A Partner?

NO ONE can write a contract, it seems, that will suit all parties interested directly or otherwise in the Elk Hills Naval Reserve. The Navy Department seems reasonably willing but the Justice Department and Congress are at variance. The Army on the other hand seems to have no difficulties with its contracts in Canada —thought of today and done tomorrow.

The latest contract proposed for Elk Hills, although its legal verbage is too complicated for the understanding of the average layman, seems about the kind of agreement two private owners might work under. But the Attorney General says no, and he has the full sympathy of an element which fears "Standard" might profit in the deal.

If the big legal department of the government will not approve contracts which the Navy is anxious to make with a co-owner of a piece of oil land—when the deal is approximately what individual owners would work under—we must wonder what kind of a partner the government is going to be if and when those talked of foreign development partnerships are proposed.

War Demands Best Parts of Crude

THAT the present military consumption of petroleum products is enormous not only quantitatively, but also qualitatively, is a fact likely to be overlooked by the average observer. It is also a fact which has a very important bearing on the present quality of gasoline for civilian consumption.

Assistant Secretary of the Navy, Ralph Bard, pointed out at the API meeting in Chicago, that all military needs require what petroleum men call "heart cuts" out of the crude petroleum. To obtain these "heart cuts" tends to unbalance refinery runs, impairing the total output of usable products from a given quantity of crude oil. Moreover, the more of the volatile elements which are taken out of the crude for military use, the lower the quality of products available for civilian consumption. This statement is particularly true of refining operations which have been undertaken to obtain gasoline with octane ratings in excess of 100. In many instances the drive to obtain these super-high-octane gasolines has resulted in a net deterioration of all other available petroleum products. Thus, military demands place an excessive strain on our petroleum resources.

With the constantly increasing demand for the high-octane fuels and the corresponding growth in their manufacture, the general effect on civilian products will become more generally felt. It is well that the public be informed as to the reason for the lowered quality of its motor fuel. With proper understanding, the situation should be accepted as a matter of fact—and necessity.

Petroleum Spent Its Own Money

IN THE expansion of manufacturing plants for the purpose of making the United States the Arsenal of Democracy, the petroleum industry has spent a higher percentage of its own money than any other major industry. In other words, oil has used less public funds than any other business. It is interesting to note that government ownership of new plants is greatest where post-war conversion prospects are least certain.

The following tabulation, prepared from a chart compiled by the National Industrial Conference Board, Inc., appeared in THE LAMP, Standard Oil Company (New Jersey) house organ, shows the percentage of total value of additions to manufacturing plants from June, 1940, to February, 1943, supplied by private and government funds:

Industry	Private	Government
Petroleum	58.8	41.2
Machine Tools	44.2	55.8
Miscellaneous Manufacturing	40.3	59.7
Machinery	35.7	64.3
Iron and Steel	28.6	71.4
Nonferrous Metals	21.7	78.3
Chemicals	18.5	81.5
Combat and Motorized Vehicles	13.7	86.3
Guns	9.6	90.4
Ammunition	9.2	90.8
Aircraft	7.0	93.0
Shipbuilding	4.0	96.0
Explosives	.4	99.6

Parade of Harassed Giants Increasing

NOW comes another giant, groaning under the weight of trying to "hold the line," to join the parade of industries harassed by difficulties of experiencing higher labor and other costs while price ceilings are enforced. This time it is the steel industry.

Benjamin F. Fairless, president of United States Steel Corporation, commenting on the announcement of the United Steel workers of America, that the union is giving notice to reopen existing labor contracts with various steel producing companies, said:

"We believe in holding the line against inflation and have practiced that sound governmental policy to date. We shall continue to do so as long as this is possible. But if the line is to be breached by the union, the steel corporation is certainly entitled to adequate protection against the financial consequences to it of that breach."

He then shows that the average hourly earnings of all wage earners in the company's steel producing and fabricating subsidiaries, both North and South, has increased 35.9 percent, between January, 1941, and October, 1943. Also, that during October, 1943, the average weekly earnings of all such wage earners, was $50.42 per week, as compared with $33.01 per week during January, 1941. These increases are more than double the reported advance in the cost of living index during the same period.

"What has happened to our steel prices between January 1, 1941, and the present time?" he asks. "Practically nothing," he answers. Prices for major steel products today are the same as the published prices of 1939. While our prices for steel products in general have not advanced, our costs have gone up most substantially, since January 1, 1941. Increased labor rates alone have added about $135,000,000 a year to our total employment costs throughout the steel corporation. Building up our manufacturing operations to full capacity, with resulting economies from such greater production, has been a major factor in enabling us to date to absorb these additional costs and leave a small balance for our stockholders. The end of that road has been reached however. We cannot repeat this operation, as we are now operating at full capacity."

So speaks steel. It sounds almost like oil, but the wail of the unions may carry its voice farther.

District Three Crude Output Now Nearing Producing Ability

Committee study reveals recent production rates of all states in area, except Texas, now above efficient level and that Texas should produce but 100,000 barrels more

PAW's District 3, which accounts for over 50 percent of the crude oil of the United States, can produce but 100,000 barrels more than it will produce in December, and all this quantity is located in Texas, for other states comprising this region are producing above their maximum efficient rate. These conclusions are drawn after studying a report of the district's Production Committee Subcommittee on Reserves and Development, which has just finished a study of the area's ability to produce.

The committee's report shows that Arkansas, Louisiana, Mississippi, New Mexico and Texas, which comprise District 3, had the ability to produce a total of 2,617,203 barrels of crude oil per day as of December 1, 1943, and that this was 219,094 barrels per day more than they produced in September.

Since September, however, production in the territory has increased sharply, especially in Texas, and a comparison of the committee's statistics with more recent producing rates reveals that the region can produce but 131,403 more barrels than actual output in November, and but 136,003 more barrels than PAW's allocations for December. Actual production recently has been exceeding PAW allocations, indicating that December recovery will be within 100,000 barrels of the figure the committee considers to be the territory's ability to produce without waste.

Texas alone is responsible for the region's ability to produce larger quantities than currently being produced, for all other states produced at higher rates during November than the committee considered efficient.

The committee gave Texas a producing ability rating of 2,068,382 barrels per day, which was 240,577 barrels greater than its September production. Higher production in November reduced this margin to 174,682 barrels. Texas' excess producing ability is in West Texas, which the committee believes can produce 486,491 barrels per day. This figure is 168,848 barrels more than its September production and around 125,000 barrels more than its output in recent weeks. While other regions of this state accounted for an additional producing ability amounting to 72,000 barrels back in September, current production in every instance is very close to and in some territories above the committee's estimate of efficient rates.

The committee's study indicated that Arkansas was producing at its efficient rate back in September, there being a difference of only 207 barrels between the estimated ability to produce and actual September production. However, November actual production was 6280 barrels over the committee's availability figure.

Louisiana was credited with the ability to produce 338,575 barrels per day, which was 1342 barrels greater than its Sep-

■ CONTINUED ON PAGE 76

Comparison of Committee Ability Estimates and Recent Production Rates

	November Actual Crude Production	December PAW Crude Allocation	Committee Estimate of Ability to Produce	DIFFERENCE	
				November Actual and Estimated Ability	December Allocation and Estimated Ability
Arkansas	78,300	76,900	72,020	— 6,280	— 4,880
Louisiana	351,100	353,700	338,575	— 12,525	— 15,125
Mississippi	50,000	48,000	36,342	— 13,658	— 11,658
New Mexico	112,700	110,600	101,884	— 10,816	— 8,716
Texas	1,893,700	1,892,000	2,068,382	+174,682	+176,382
Total	2,485,800	2,481,200	2,617,203	+131,403	+136,003

Producing Ability Report of PAW District 3 Committee

STATE OR DISTRICT	Barrels per Calendar Day		December 1, 1943	
	September Production	November Allowable	Committee Determination Of Ability	Additional Availability Over Sept. Production
Arkansas:				
Uncontrolled	20,495	20,495*	19,565	— 930
Controlled	51,318	57,831	52,455	+ 1,137
Total	71,813	78,326	72,020	+ 207
Louisiana:				
North Louisiana	68,107	77,787	59,995	— 8,112
South Louisiana	269,126	282,758	278,580	+ 9,454
Total	337,233	360,545	338,575	+ 1,342
Mississippi	48,765	48,765*	36,342	— 12,423
New Mexico:				
Northwestern	1,127	1,127	1,112	— 15
Southeastern	111,366	114,311	100,772	— 10,594
Total	112,493	115,438	101,884	— 10,609
Texas:				
District 1	20,202	25,427	22,186	+ 1,984
District 2	117,081	147,080	137,270	+ 20,189
District 3	448,938	511,347	477,621	+ 28,683
District 4	155,830	191,840	176,354	+ 20,524
District 5	27,324	42,945	43,431	+ 16,107
District 6	480,111	494,264	482,861	+ 2,750
District 7-B	25,383	30,766	23,931	— 1,452
District 7-C	18,225	20,697	23,217	+ 4,992
District 8	317,643	362,415	486,491	+ 168,848
District 9	115,009	134,653	105,020	— 9,989
District 10	102,059	92,948	90,000	— 12,059
Total	1,827,805	2,054,382	2,068,382	+ 240,577
Grand Total District 3	2,398,109	2,657,456	2,617,203	+ 219,094

* September Reported Production.

Expanded Production Balances November Supply with Demand

Peak output of wells and refineries reaches sufficient level to stop heavy withdrawals from stocks, but this favorable showing still leaves supply outlook critical

By WARREN L. BAKER, Editor

EXPANSION of crude oil production to the highest level in history and refinery runs to near record rates during November, enabled the industry to achieve its most favorable balance between supply and demand in months. The continued rise of production to new all-time peak levels each succeeding month, resulted in November output attaining a sufficiently high level to permit substantial additions to crude oil stocks in contrast with heavy withdrawals during the summer. The enlarged volume of refinery operations made it possible to check heavy withdrawals from refined product inventories that had existed in earlier months.

Outlook Still Acute

The more encouraging showing achieved in November, however, was not sufficiently favorable to alleviate the prospects of an oil shortage in the United States during 1944. The supply situation remains urgent and pressing, and stands out as the most acute problem confronting the industry in the third year of war.

Military use of petroleum is expected to skyrocket to much higher levels in 1944, when fighting should be more intensive and widespread. If sufficient petroleum is to be produced to fill anticipated requirements it may be necessary for the United States to produce 1,700,000,000 barrels during 1944, according to some authoritative estimates. The whole world produced only little more than that amount in 1942, the combined yield of all countries amounting to slightly less than 2 billion barrels in that year. To produce this quantity of oil, it would be necessary to increase output 200 million barrels over the all-time annual high of 1½ billion barrels that will be produced in 1943, which would mean that daily average production would have to be boosted to 4,655,000 barrels, or 250,000 barrels above levels that have existed in recent record months.

In view of the poor discovery trend in recent years, and the fact that exceptionally sharp gains in production rates have absorbed practically all surplus producing capacity, it is doubtful if the United States can produce such a large volume of oil throughout the year. Moreover, sharp gains in production of most foreign countries has occurred recently, and there is speculation as to how much more they can produce without additional development.

Production Still Rising

Showing a steady and sometimes sharp rise each successive month throughout the year, with the exception of June, United States crude oil producing rates have established new all-time daily peaks each month since July. Daily production has climbed from an average of 3,781,000 barrels in January of this year, to an all-time peak of 4,214,000 barrels during August, and in November had increased to 4,413,000 barrels. Thus, production during the past month was 632,000 barrels per day greater than in the first month of the year, and almost 200,000 barrels more than in August.

Production in December will be at another new record high, PAW having issued certifications of 4,425,100 barrels of crude, in addition to 269,100 barrels of natural gasoline and condensate. Of late, oil production has been exceeding PAW national allocations, so it is to be anticipated that actual output will be somewhat greater in December.

During the first 11 months of the year, the United States has produced 1,366,483,000 barrels of crude oil, almost as much as it produced in the full year of 1942. The volume of oil produced so far during 1943 is 101 million barrels, or 8 percent, greater than the 1,264,960,000 barrels produced during the first 11 months of 1942.

Texas Output Up

The largest portion of the national increase in crude oil production has been contributed by Texas. This state has produced 592 million barrels during the 11 months of the year, a gain of 152 million barrels, or 34.5 percent, over its 1942 rate, when lack of transportation resulted in cutting back of its production rate. Whereas Texas has produced an average of 1,773,300 barrels daily during the first 11 months of the year, its November production was 120,000 bar-

United States Crude Oil Production and Crude Oil Stock Trends

(Based on Bureau of Mines Data, except for last two months of 1943, which are estimated from API weekly statistics)

	CRUDE PRODUCTION				CRUDE STOCKS			
	Monthly Total		Daily Average		End of Month		Change in Month	
MONTH	1943	1942	1943	1942	1943	1942	1943	1942
January	117,227,000	128,262,000	3,781,500	4,137,500	234,423,000	253,531,000	+ 69,000	+ 6,647,000
February	108,399,000	113,961,000	3,871,400	4,070,000	237,075,000	260,844,000	+ 2,652,000	+ 7,313,000
March	121,560,000	114,473,000	3,921,300	3,692,700	242,181,000	261,832,000	+ 5,106,000	+ 988,000
April	119,000,000	105,053,000	3,966,700	3,501,800	242,934,000	257,761,000	+ 753,000	— 4,071,000
May	123,854,000	110,192,000	3,995,300	3,554,600	243,880,000	254,577,000	+ 946,000	— 3,184,000
June	119,302,000	108,595,000	3,976,700	3,619,800	240,601,000	251,421,000	— 3,279,000	— 3,156,000
July	127,493,000	111,782,000	4,112,700	3,605,900	238,989,000	245,026,000	— 1,612,000	— 6,395,000
August	130,633,000	120,429,000	4,214,000	3,884,000	237,085,000	244,125,000	— 1,904,000	— 901,000
September	130,407,000	115,801,000	4,346,900	3,860,000	236,287,000	240,043,000	— 798,000	— 4,082,000
October	136,209,000	120,311,000	4,393,800	3,881,000	237,219,000	237,361,000	+ 932,000	— 2,682,000
November	132,399,000	116,101,000	4,413,300	3,870,000	239,761,000	234,100,000	+ 2,542,000	— 3,261,000
Total 11 Months	1,366,483,000	1,264,960,000	4,091,300	3,787,300	.....	.....	.....	.....

rels greater in averaging 1,893,700 barrels daily. Texas production in November was 573,000 barrels per day higher than in January of this year, 812,700 barrels larger than its wartime low reached in April of 1942, and is 361,400 barrels more than its production at the time of Pearl Harbor.

California, the second largest producing state, also ranks next to Texas in number of additional barrels produced this year. In producing 235 million barrels during the first 11 months, the West Coast's only oil state has raised its output nearly 11 million barrels above a year ago.

An encouraging production note is to be found in Oklahoma's production trend. Due to declining output in the early part of the year, the state's production for the first 11 months is 13 percent under its output for the same period of 1942, but in recent months its producing rate has increased. During November, Oklahoma produced an average of 347,000 barrels daily, in comparison with a production of 340,000 barrels per day in both January and June of this year.

Louisiana's daily average production has risen from 317,700 barrels in January to 351,100 barrels in November, and its production for 11 months is 5 percent larger than a year ago.

The most serious drop in production rate is that of Illinois, with 30 percent less oil in the 11 months than a year ago. Production of this state was near 400,000 barrels daily at the start of the war, but in November was down to 219,000 barrels.

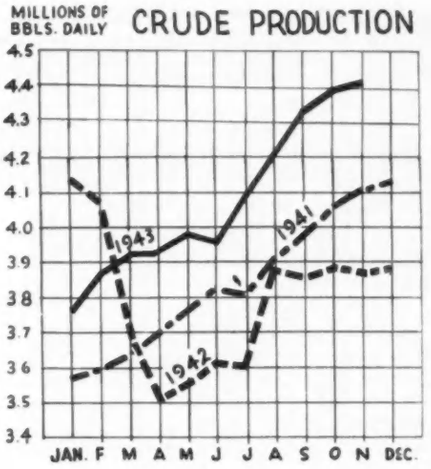
Kansas production has dropped from 295,200 barrels in January to 272,200 barrels per day in November, but it has produced 9.9 percent more oil in 11 months of this year than in 1942.

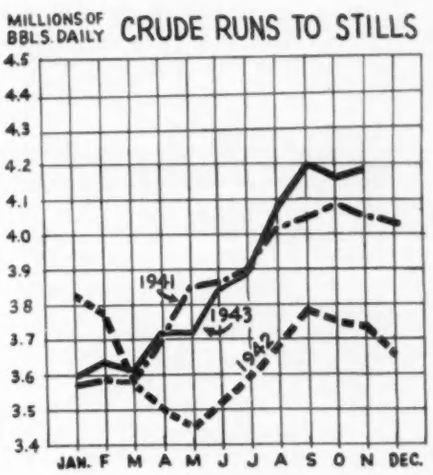
Mississippi is another state that has produced less oil, its record for the 11 months of 1943 being 34 percent or 9000 barrels less than in 1942.

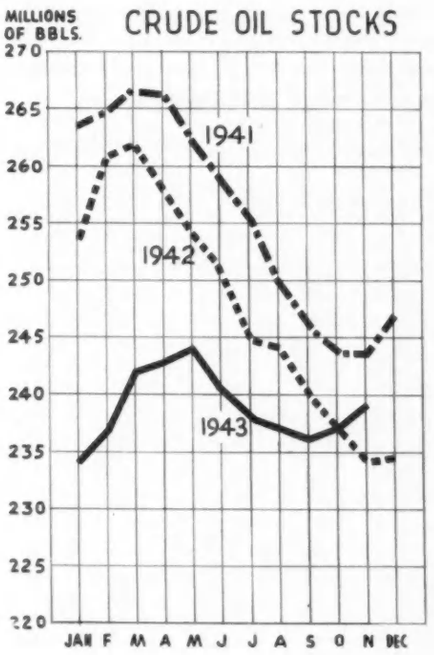
Crude Stocks Higher

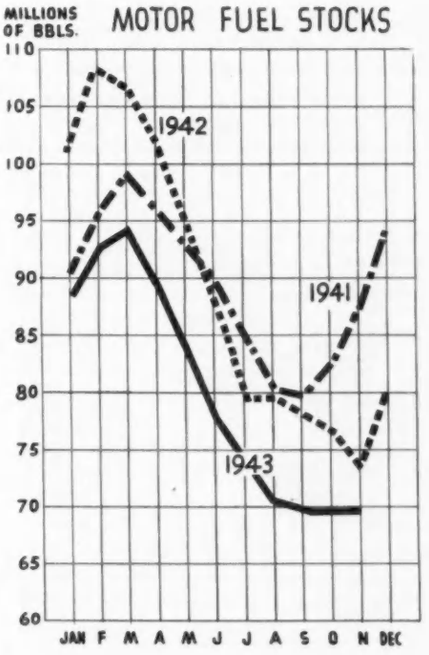
The continued rising rates finally boosted crude production to sufficiently high levels that substantial additions to crude stocks occurred during November, in contrast with heavy withdrawals during the summer and early autumn. For the first time this year, more crude oil is in storage than at corresponding periods a year ago.

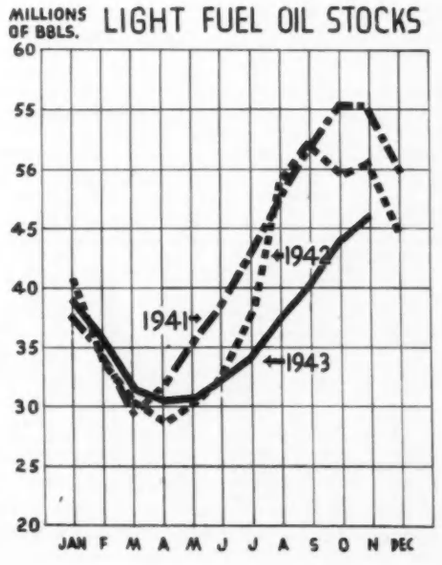
Stocks of crude oil at the end of November totaled almost 240 million barrels, up 2,542,000 barrels from the end of October. This represented a daily average increase of 84,730 barrels. Inventories of crude oil now are nearly 6 million barrels greater than a year ago. However, they are still 4 million barrels under the 243.8 million in tanks the end of May this year, 3 million bar-

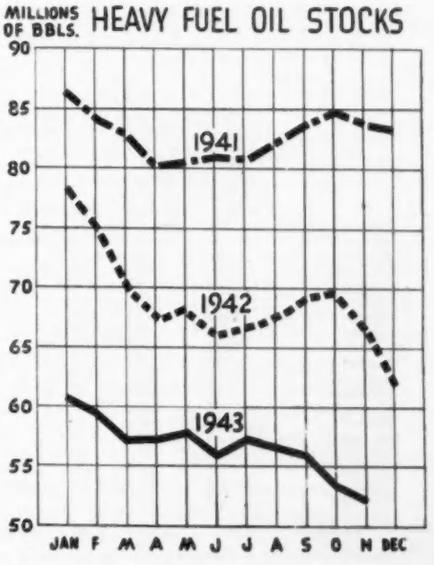












U. S. Stocks of Major Petroleum Products at End of November

(Thousands of Barrels. Data from API)

REFINING DISTRICT	Nov. 29, 1941	Nov. 28, 1942	Nov. 27, 1943	PERCENT CHANGE From 2 Years Ago	PERCENT CHANGE From 1 Year Ago
GASOLINE: (Finished and Unfinished):					
East Coast, Texas, Louisiana, Arkansas	36,809	37,385	31,497	— 14.5	— 15.7
Appalachian	3,447	2,549	2,507	— 27.3	— 1.6
Indiana, Illinois, Kentucky, etc	15,469	13,467	13,625	— 11.9	+ 1.2
Oklahoma, Kansas, Missouri	7,858	5,996	6,889	— 12.3	+ 14.9
Rocky Mountain	1,134	1,481	1,265	+ 11.5	— 15.3
California	15,458	17,576	14,197	— 8.1	— 19.2
Total United States	85,525	78,854	69,980	— 18.2	— 11.2
GAS OIL AND DISTILLATE:					
East Coast, Texas, Louisiana, Arkansas	31,171	27,224	23,269	— 25.3	— 14.5
Appalachian	696	761	1,138	+ 63.5	+ 49.5
Indiana, Illinois, Kentucky, etc	5,542	6,330	6,598	+ 19.2	+ 4.2
Oklahoma, Kansas, Missouri	2,023	2,043	2,465	+ 21.8	+ 20.6
Rocky Mountain	145	423	458	+215.8	+ 8.3
California	12,964	12,958	12,259	— 5.4	— 5.4
Total United States	54,141	49,739	46,187	— 14.7	— 7.1
RESIDUAL FUEL OIL:					
East Coast, Texas, Louisiana, Arkansas	24,485	17,271	18,463	— 24.5	+ 6.9
Appalachian	414	387	308	— 25.6	— 20.4
Indiana, Illinois, Kentucky, etc	4,560	2,449	2,909	— 36.2	+ 18.8
Oklahoma, Kansas, Missouri	2,232	1,438	1,154	— 48.3	— 19.7
Rocky Mountain	346	600	765	+121.1	+ 27.5
California	62,684	55,651	38,544	— 38.5	— 30.7
Total United States	95,971	77,796	62,143	— 35.2	— 20.1

Fluctuations in Crude Stocks, By Grade or Origin, Since Pearl Harbor

(Thousands of Barrels)

Grade or Origin	Outbreak of War for U.S., Dec. 13, 1941	High for 1942-1943 (Mar. 28, 1942)	Low for 1942-1943 (Dec. 12, 1942)	Current Data Nov. 27, 1943	Change from Mar. 28, 1942	Change from Dec. 12, 1942
Pennsylvania Grade	3,633	3,431	3,054	2,542	— 2,542	— 512
Other Appalachian	1,529	1,522	1,356	1,577	+ 38	+ 221
Lima-Michigan	1,233	1,549	1,208	1,067	— 482	— 141
Illinois-Indiana	18,243	19,337	9,494	12,205	— 7,132	+ 2,711
Arkansas	2,591	2,977	2,068	3,197	+ 220	+ 1,129
Kansas	7,400	7,696	6,898	8,066	+ 370	+ 1,168
Louisiana	12,348	13,669	12,732	13,966	+ 297	+ 1,234
Northern Louisiana	3,849	4,223	4,745	4,456	+ 233	— 289
Gulf Coast Louisiana	8,499	9,446	7,987	9,510	+ 64	+ 1,523
Mississippi	2,202	2,445	1,174	1,003	— 1,242	— 171
New Mexico	6,781	7,510	5,622	8,144	+ 634	+ 2,522
Oklahoma	51,562	50,513	40,111	33,171	—17,342	— 6,940
Texas	81,676	96,123	102,130	109,190	+13,067	+ 7,060
East Texas	20,549	23,677	24,468	23,679	+ 2	— 789
West Texas	18,070	23,961	24,252	26,587	+ 2,626	+ 2,335
Gulf Coast	23,935	25,889	28,388	31,939	+ 6,050	+ 3,551
Other Texas	19,122	22,596	25,022	26,985	+ 4,389	+ 1,963
Panhandle	.....	.....	4,670	6,630	.....	+ 1,960
North	.....	.....	7,491	5,939	.....	— 1,552
South	.....	.....	4,879	5,606	.....	+ 727
Other	.....	.....	7,982	8,810	.....	+ 828
Rocky Mountain	16,267	16,628	13,934	11,942	— 4,686	— 1,992
California	34,574	38,454	31,965	32,600	— 5,854	+ 600
Foreign	2,644	1,354	150	1,176	— 178	+ 1,026
Total Gasoline-bearing in U.S.	242,683	263,208	231,896	239,761	—23,447	+ 7,865
Heavy in California	10,128	11,336	10,607	8,393	— 2,943	— 2,214

Crude Oil Production Trend By States

Data in thousands of barrels. From Bureau of Mines, except October and November, 1943, from American Petroleum Institute.

State or District	WARTIME FLUCTUATIONS IN DAILY AVERAGE PRODUCTION: Peak Before U.S. Entry in War: Dec., 1941	Low After U.S. Entry in War: April, 1942	Jan., 1943	June, 1943	Nov., 1943	PRODUCTION IN FIRST ELEVEN MONTHS, 1942-1943: Total Amount 1942	Total Amount 1943	Daily Average 1942	Daily Average 1943	Percent Difference
Arkansas	74.3	71.6	73.9	76.8	78.3	24,330	25,121	72.8	75.2	+ 3.4
California	631.9	637.5	764.1	776.0	784.7	224,337	235,011	671.6	703.6	+ 4.5
Colorado	6.1	5.7	6.4	6.3	7.3	2,027	2,144	6.0	6.4	+ 6.6
Eastern	84.1	69.0	75.0	79.6	76.4	27,929	25,448	83.6	76.1	— 8.8
Illinois	397.8	301.6	238.7	222.7	219.1	98,697	68,578	295.5	205.3	—30.5
Indiana	18.6	19.8	15.6	14.5	13.4	6,253	4,856	18.7	14.5	— 2.8
Kansas	256.7	249.8	295.2	288.2	272.2	88,736	97,564	265.6	292.1	+ 9.9
Kentucky	12.7	11.9	16.3	22.1	23.7	3,975	6,440	11.9	19.2	+61.3
Louisiana	347.4	306.8	317.7	323.0	351.1	106,334	112,001	318.3	335.3	+ 5.0
Michigan	56.8	62.5	57.6	57.2	54.1	9,888	19,100	59.5	60.1	+ 1.1
Mississippi	70.5	96.2	57.0	53.7	50.0	26,970	17,800	80.7	53.2	—34.0
Montana	22.0	22.0	18.6	21.9	21.6	7,396	7,097	22.1	21.2	— 4.0
Nebraska	5.1	3.9	2.1	1.9	1.7	1,159	635	3.4	1.9	—45.2
New Mexico	112.2	67.3	96.7	105.0	112.7	28,698	32,360	85.9	96.8	+12.7
Oklahoma	427.6	389.6	340.5	339.0	347.0	129,563	112,703	387.9	337.4	—13.0
Texas	1,532.3	1,081.0	1,320.7	1,498.4	1,893.7	439,887	592,285	1,317.0	1,773.3	+34.5
Wyoming	82.2	85.4	85.2	90.3	101.1	28,725	30,892	86.0	92.4	+ 7.8
Total U.S.	4,138.5	3,501.8	3,781.5	3,976.7	4,413.3	1,264,960	1,366,483	3,787.3	4,091.2	+ 8.0

rels under the level of storage at the outbreak of war, and are 23.4 million barrels under the high point for the years 1942-1943, which was in late March of 1942.

The enlarged production rates in Texas have resulted in most of the accumulation of higher oil stocks occurring in this state, which now has almost half of the quantity in storage in the nation. Of the 239.7 million barrels of crude oil in stock tanks, 109 million barrels of it is Texas crude. It is the only state to make substantial additions since the recent high attained on March 28, 1942. While the national total has declined 23.4 million barrels since that date, Texas stocks have gained 13 million barrels; and of the 7.8 million barrel gain in national stocks Texas has contributed 7 million barrels.

Since December 12, 1942, crude inventories of Illinois-Indiana crude have grown 2.7 million barrels, New Mexico 2.5 million; Louisiana 1.2 million; Arkansas 1.1 million, and Kansas 1.1 million. A substantial draft of 6.9 million barrels has occurred in Oklahoma stocks, and minor decreases in other areas.

Refined Stocks

The high level of crude runs to stills, which averaged approximately 4,175,000 barrels daily in November, according to the American Petroleum Institute, resulted in sufficient output to check the decline in refined product stocks. However, refinery stocks are far from satisfactory, being materially beneath levels of a year ago and two years ago.

Stocks of gasoline the end of November were slightly higher than the end of October, totaling 69.9 million barrels against 69.2 million barrels. Heavy or residual fuel oil stocks dropped slightly, amount to 62.1 million in contrast with 63.8 million barrels 30 days ago. Meanwhile, distillate or light fuel oil inventories rose from 44.5 million to 46.1 million barrels.

However, stock levels for all three of the industry's principal products are still too low, and therefore remain critical. Gasoline stocks are 18.2 percent behind inventories two years ago, and 11.2 percent under a year ago. Distillate fuel is 14.7 percent beneath stocks of two years ago and 7.1 percent under a year ago.

The Indiana - Illinois - Kentucky and Oklahoma-Kansas-Missouri regions are the only areas with more gasoline stocks than a year ago, with others showing decreases ranging upward to 19.2 percent in California. The combined East Coast-Texas-Louisiana-Arkansas and California regions are the only territories with less distillate fuel in storage than a year ago, but the slump in these two areas is sufficient to offset increases in other parts of the country.

Need of Oil Cause of Many Property Deals

By A. R. McTEE, Staff Writer

IF SUFFICIENT quantities of materials for wildcatting can be made available, the accelerated exploration program sought by the government may result from an unexpected source, namely the necessity of securing adequate stocks of crude to keep refineries running at capacities to insure profitable operation. Recent purchases of producing properties indicates that some large companies face an emergency in this respect. The need for crude at any price is undoubtedly responsible for the high prices being paid for production, and appears to be the mainspring behind the undercurrent to acquire producing acreage. There is doubt whether adequate properties can even be bought to forestall crude shortages for these companies.

A good many independent producers have taken the high prices offered for their properties, but have done so largely because the offers were too tempting to turn down. In only a few cases has the element of sacrifice played any part. Vexation at regulation and restriction has in some instances helped the seller make up his mind, but has hardly been the determining factor in letting properties go. Fear of permanent government control has been another influencing factor, with some deciding to get their money out while they are sure of getting it. Comparatively few properties of merit remain on the block anywhere at any reasonable price. No bargains are being kicked around.

In East Texas, oil in the ground has brought from $1.00 to $1.25 per barrel. Normally the price paid would range from 15 to 50 cents per barrel. Buyers are either speculating on future prospects, or they are looking crude shortages squarely in the face.

The peak price per well paid for East Texas properties went to $108,312.50. Other deals were made for smaller leases that averaged $100,000 or more per well. These prices are approximately double individual well values before the war, and are no longer being paid. Such values require from 18 to 20 years at prevailing production allowables and crude prices to amortize the initial lease investment. Hence it is easy to see why sales at such prices are limited. With better crude prices, however, $100,000 or more per well for high-pressure, thick-sand, production might become commonplace.

A good many of the large oil companies do not produce enough oil for their refining needs. One of the largest in the country, for instance, ran 105.1 million barrels of crude through its refineries during 1942, of which only 40.5 million barrels was its own production. Another company produced 15 million barrels and processed 41 million barrels.

As regards crude supplies in relation to their refining operations, companies in the oil industry fall roughly into four classes: those which produce less than 50 percent of their refining requirements; companies which produce sufficient oil to meet more than 50 percent of their needs; companies which produce more oil than they refine; and those which produce oil but do not refine it.

Companies in the first two classes, namely those which produce less oil than they need for their refining operations, in normal times have always been able to buy crude for their plants. There are many of these plants on the East Coast. During the emergency, they are being supplied temporarily with crude through directives from Washington, and at the expense of companies that have purposely accumulated backlogs of oil for just such a period as is now at hand. Realization that this source of oil will certainly stop as soon as the war ends by action of the companies controlling the oil, and possibly sooner through declining reserves, the companies short of crude are making every effort to protect themselves by creating their own reserves through the purchase of producing properties.

Such purchasers may be influenced somewhat by a hunch that higher prices will be posted. On the other hand strong indications are that they feel they cannot afford to wait for that time because of competition and the lack of properties to be bought.

Extensive trading during the first half of the year skimmed off a large portion of the producing properties available for purchase in West Texas. Independents, sorely tried by restrictions and regulations as mentioned earlier, and faced by considerable uncertainty as to the future on account of the war and also by their crude being second and third choice by refiners because of its nature, took advantage of prices offered. Values rose sufficiently to permit the closing of deals on terms satisfactory to seller and buyer, although crude quotations remained unchanged.

Peak prices also were paid in North Texas earlier in the year. Here the need for sweet oil to meet refinery demands dictated the terms. Producers were paid their asking price, electing to sell when their offers were taken up.

A few trades have also taken place in the Gulf Coast district, at prices comparable to those paid in other parts of Texas.

Government demands for 100-octane gasoline are constantly increasing. Under Secretary of the Navy, James Forrestal cited the need recently, when he said, "Production of this super-fuel on schedule is most vital to the Navy, to enable it to carry out its offensives on schedule. The Navy's air strategy hinges on the ability to produce the necessary quantities of 100-octane gasoline for its planes."

To increase the production of this gasoline, a $900,000,000 program is well under way. The 1942-43 program called for 72 major plants, 32 of which are now operating and the remaining 40 being scheduled for operation during the next three months. In 1944, 22 more plants will have to be built, on schedule, if our war demands are to be fulfilled.

Crude oil to meet this demand must be supplied on schedule. Decreasing reserves naturally stimulate the trend for large integrated companies to buy insurance against a shortage of supplies for their plants. One large Mid-Continent company, for example, has more than 100,000 barrels refining capacity, but virtually no crude backlog. Since it had always been possible to buy full requirements from others, this company drew out of the producing business several years ago. Now, having built up an extensive, successful refining and marketing unit, the company finds itself hard pressed for crude. Already it has launched a somewhat reckless drilling campaign in Louisiana, Arkansas and Texas, running into millions of dollars, trying to insure its future with controlled oil.

The Petroleum Policy of The United States

By SENATOR RALPH O. BREWSTER of Maine

At Dedication of Standard Oil Company of New Jersey Aviation Gasoline Plant at Baltimore, December 1, 1943

As a boy my great-grandfather told me of reading by the light of the fireplace. Later his mother allowed him a candle. Finally came the whale-oil lamp from the Yankee whalers of Nantucket —to give place later to the kerosine lamps of my own youth. The petroleum age was dawning.

Now we gather here in the shadow of the Capital to dedicate this latest offering at the shrine of Mars. This utterly bewildering mechanical marvel towering 235 feet in the air to dwarf the test tubes of our laboratory days in school is a guarantee that the United Nations will prevail.

Here today is symbolized the evolution of petroleum in its service to mankind.

In this century petroleum has come to reign supreme over the other elements that were long the desire of all mankind. Petroleum today is power.

The nation shuddered ten days ago when the Petroleum Administrator for War at Chicago declared that America would not be able "to oil another war." Obviously Secretary Ickes does not mean that we want another war but has in mind for the United States to be so prepared with petroleum resources that another war will be prevented.

As the "five innocents abroad" set out on their aerial travels around the world, Senator Truman instructed Senator Mead and myself among other things to look carefully into the petroleum situation. What we found gave us considerable occasion for concern.

Significance of Oil

The first impression was the profound significance of petroleum in the modern world and particularly in modern war. More than 50 percent of the tonnage to the Mediterranean theater of operations this past year has been petroleum products.

A ton of bombs on Berlin predicates approximately 4 to 5 tons of petroleum.

A modern bomber takes around a gallon of high-octane gasoline per mile. Nothing better illustrates the latent power of petroleum than to realize that one of these gigantic machines of modern war weighing 10 to 20 tons with its bomb load can be carried nearly a mile through the air by a single gallon of high-octane gasoline such as this new plant turns out.

Yet this also means that a thousand bombers over Berlin require a million and a half gallons of high-octane gasoline to get them there and back.

No one begrudges our air force or our allies the enormous tonnage of petroleum to keep them in the air but as we talk of tremendously expanded armies and navies and air forces, it behooves us to make sure we have the gasoline to keep them going.

We may have all the ships and planes and tanks in the world but without petroleum they are nothing—they are but sounding brass and tinkling cymbals.

It is both interesting and significant to note that 90 percent of the petroleum resources of the earth are controlled by the United Nations.

Germany has performed a miracle in producing high-octane gasoline from coal but at a tremendous drain upon her other resources of material and manpower to create the facilities and keep them functioning.

Strategic studies all indicate that a petroleum economy, other things being equal will defeat a coal economy at this stage in the world's history and this condition seems likely to continue for at least many decades.

This week I attended the commissioning of the "Hornet," the latest word in aircraft carriers. I saw its nest for 100 planes and also the tanks in which must go millions of gallons of oil and gasoline without which its striking power is paralyzed.

Five hundred gallons of oil are required to send this ship a single mile on its 10,000-mile journey to Tokyo. We are now told there are 40 Hornets, large and small, in the Pacific and 800 naval fighting craft are mustering their strength to restore peace to the Pacific.

Meanwhile the entire economy of the United States functioning as an arsenal for the United Nations is built upon a petroleum base.

Two hundred million gallons of petroleum flow through the pipes of the United Nations every day to keep our economy functioning and to keep our ships on the seven seas and to keep our planes today over Berlin and to put them tomorrow over Tokyo.

Senator Truman's insistence that we look into petroleum can accordingly be understood. Everywhere we traveled on the 45,000-mile trip around the world we began and ended with petroleum. I will not soon forget the profound relief with which we sighted the west coast of Australia after a 3200-mile flight across the Indian Ocean from Ceylon—with the Japanese-held Sumatra and Java as the only possible places of refuge in case of trouble—and learned that our Liberator still had 750 gallons of gasoline in its tank out of the 4000-gallon stock with which it started.

We witnessed with amazement the 200-mile pipe line laid in two weeks from Casablanca to Marakesh to supply this cross-roads of aerial traffic from the four corners of the world.

Our first real shock came at Abadan on the Persian Gulf where we found one of the greatest refineries in the world under British control operating far below its capacity with a potential increase of 40 percent in its output. This occasioned our first inquiry as to the sources of our petroleum supply and has led to a study of the entire situation

from the standpoint of United States policy regarding petroleum.

The first great difficulty was to find out the facts. Experts from the government before the Truman Committee were not able to satisfy even themselves as to the extent of petroleum reserves in the world. One quickly becomes lost in the maze of "proven" reserves and "estimated" reserves and various other kind of reserves which permit statisticians to prove almost anything that may be desired.

Government representatives of the highest standing whose expertness and honesty we have no reason to question give a figure of 20 billion barrels at one moment for a certain area and later refine that figure to 2½ billion barrels.

Refining capacity also seems difficult to define as the refining capacity at Abadan varied by 75 thousand barrels a day in successive reports.

The inquiries of a layman are also handicapped by the confusion existing among the various governmental agencies involved. One very naturally turns on a topic of this importance to Secretary Ickes, Petroleum Administrator for War. Certainly this resounding name would seem to signify an over-all knowledge of petroleum and its products and the policy of the United States government in relation thereto.

Yet, this past week, Secretary Ickes has testified publicly before the Truman Committee that the first knowledge he had regarding the $120,000,000 Canol project in northern Canada came via the lobby of the Mayflower Hotel and that much of his other information regarding petroleum policies of other agencies of the government comes from British rather than American sources.

The War Department and the Navy Department with their tremendous requirements in petroleum as a result of the insatiable appetite of ships and planes and tanks are proceeding apparently to a considerable extent upon their own in determining their sources although coordination with the even more tremendous demands of the civilian economy would seem to be an imperative requirement.

Meanwhile, the Office of Foreign Economic Administration is becoming concerned with the problem of petroleum reserves abroad and has created a corporation to consider functioning in this field and the possibility of acquiring interests in petroleum reserves in other countries.

The State Department here becomes concerned since American interests abroad are necessarily a matter within the purview of the State Department and the actual acquisition of an interest by the United States government in petroleum reserves in other countries would necessarily mean a radical reorientation of our entire foreign policy—first in the degree and character of whatever partnership might be involved with private interests either American or foreign and second in the question of the protection of those interests in the unsettled world of tomorrow.

We were subsequently startled and disturbed to find that the United States was furnishing approximately 80 percent of the petroleum consumed by the United Nations, while Great Britain was furnishing about 8 percent although no estimates indicate that the United States has 10 times the reserves of Great Britain.

The most optimistic figures do not indicate that the United States has more than twice the reserves of Great Britain and these figures are open to serious question because of their somewhat speculative nature.

No question has been raised at any time as to necessity dictating the allocation of petroleum production heretofore because of the mandates imposed by transportation and refinery requirements.

The Germans very wisely struck at our tankers in the early days and injured us far more grievously than it was possible to admit. The recent revelation of the sinking of 14 tankers in the Atlantic last winter on their way to the Mediterranean indicates how serious was the situation and how necessary it was to conserve tanker space and mileage.

There has been in the inquiries of the senators no disposition to upset any current apple carts or any failure to recognize the necessity of concentrating every resource without regard to country on the immediate objective of the winning of the war. With less than half of the petroleum reserves of the world, America obviously cannot go on indefinitely supplying 80 percent of the consumption.

As the Mediterranean clears and the tanker situation improves it becomes possible, however, to turn to the Persian Gulf for an increased utilization of the tremendous reserves of the Middle East. It becomes possible accordingly to consider whether an increase in the refining capacity in this area may be more prudently placed so as to utilize the British rather than American reserves of petroleum since the British reserves are approximately three times the American reserves in this area.

This problem focuses the issue as to what American policy on petroleum shall be in the present and in the post-war world.

World Reserves

Petroleum seems to be found between the continents as in our own Caribbean area and in the Middle East between Asia, Europe and Africa and in the Far East between Asia and Australia. Geologists are intrigued by the potentialities of the Far North where some oil reserves have already been located and where it is thought possible additional discoveries may be made.

Accepting a Russian estimate of 40 billion barrels for Russian reserves, the consensus of expert opinion indicates about 110 billion barrels as the world oil reserve.

The Axis have available approximately 10 billion barrels.

Of the remaining 100 billion barrels Russia has 40 percent.

The United States has about 35 percent of which about half is within our own borders.

Britain in cooperation with the Dutch interests control nearly 24 percent. This leaves a little over 1 percent for all other interests.

In addition to the tremendous reserves in Russia which would apparently be sufficient for their prospective requirements for this century, Russia is also very near to the great petroleum reserves in the Persian Gulf which are chiefly under British control but in an expanding sphere of Russian influence.

American companies have meanwhile acquired certain interests in the petroleum reserves of the Persian Gulf and here seems to be one of the first fields where the United States will need to consider seriously its world policy regarding petroleum.

Russia with its tremendous petroleum reserves has not been able thus far to supply its own requirements in time of war and the other United Nations have accordingly found it necessary to supply petroleum products to keep the Russian war machine functioning. This does not necessarily condemn the Russian system of complete government operation but it is certainly in glittering contrast to the enormous production which the United States has developed under the stimulus of private exploitation.

Beyond question the United Nations have the petroleum resources with which to defeat Germany and Japan. This coincides with the conclusion of all concerned that we are going to win the war.

Serious concern, however, is beginning to be felt as to whether or not we shall win the peace that is to follow. Ten million American boys on the fighting fronts throughout the world look to us to look out for them and their vital interests in the post-war world. They want to return to a country that shall be able to carry on with policies so directed that war-loving nations shall not again be able to threaten the peace of all the world.

In this world of tomorrow, petroleum must play a most important part. Germany has demonstrated the tremendous

striking power of a nation seriously hampered for petroleum but it will be a long time before gasoline from coal or shale will supplant petroleum in world economy and during that period petroleum seems likely always to present a great advantage over coal.

The German processes, brought to this country more than a decade ago and developed here, show the feasibility of producing gasoline from coal but the expense seems to be approximately three times as great at the point of production.

This great new ultra-modern plant where we assemble today seems likely not to bow its head to coal for many decades yet to come. Meanwhile, however, the United States, in spite of its great petroleum reserves, faces the necessity of evolving a petroleum policy that shall be calculated to serve our needs beyond the next decade or two.

War Use of Reserves

We are using our petroleum reserves at the present time at the rate of more than six percent a year, which would mean their exhaustion within the next 20 years. Meanwhile the British Empire is using its reserves at the rate of little over one percent a year which would mean they should last for nearly 100 years. The Russians are apparently in a similarly favorable position.

It is interesting to note that the British have continued to keep their Merchant Marine functioning on a basis of burning coal instead of oil. In the postwar world this may be a competitive factor of great significance as the United States seeks to keep functioning 40 million tons of merchant shipping equipped with oil burners.

Peace Use of Oil

The United States takes for granted a resumption of joy riding after the war on an unprecedented scale with millions of new cars just over the horizon as the automobile industry of Detroit resumes its normal functioning.

Meanwhile a great plane industry is also germinating in the American mind that will fill the air with planes and establish international air transport on a global basis.

Even assuming far more efficient utilization of petroleum products in the improved mechanisms of tomorrow, this still adds up to unprecedented requirements for petroleum. Excluding our comfort, convenience and pleasure, the United States is also becoming persuaded that patrolling the airways of the world may be the key to peace and yet any such development to be realistic must rest primarily upon a commercial base.

American productive capacity must seek world markets, not to the exclusion of other countries but to provide those things in the mass production of which America is now supreme and an interchange of those products for other products—particularly raw materials—in which America cannot continue to be Santa Claus for all the world.

All this means world communications and transportation by sea and air. It is high time America turned its thought in this direction in justice to the millions of American boys who are fighting to create a peaceful world.

Either the United States must get access to more petroleum reserves or must restrict its own consumption.

The United States has made an extraordinary success in the development of its own oil resources under the stimulus of private competition. No other country has anything like the knowledge of its oil resources that is possessed by the United States. This is a matter of satisfaction and yet of concern since it means that our potentialities are not likely to be as great as those of other countries.

Three Courses Open

Three courses are open to our government in justice to future generations.

One is to continue the present haphazard situation with confusion among the various government departments concerned and with a policy which seems to promise the exhaustion of our petroleum reserves within another 20 years and the impossibility of the United States being able, as Secretary Ickes points out, "to oil another war." An America dependent upon other countries for petroleum would be an America very much less significant in world affairs than the America we know today.

America is now convinced that unreadiness for war is the surest road to war.

Two other courses are left.

One is for the government to go into the oil business in foreign countries either entirely on its own account or in partnership with private companies. Such a project has been more or less seriously proposed although it is evident it would involve a radical change in both our foreign and our economic policies and would have implications it is difficult to comprehend.

Suppose the United States government should have a third interest in the oil reserves of Arabia and difficulty developed between the native tribes in this region and the oil companies concerned as to the concessions or the royalties or other rights that were involved. Great Britain and Russia are also both vitally concerned in the petroleum reserves in the Persian Gulf where are located the reserves upon which the world may depend in war or peace after the next two decades.

Great Britain has found it practical to have government ownership of shares in private companies and carry on in a partnership that is a tribute to the capacity of British capital and British cabinets to get along together. Precedents for prospects of success in this field in America are rather difficult to find.

The third course would seem to be more in accordance with American tradition and precedents and to offer surer prospects of success.

The enterprise and the genius of American business men have made possible the tremendous petroleum development of America in the last half century. It is not too much to say that the success of the United Nations in this war rests upon the potentialities of the petroleum industry of the United States. While we shudder at the drain upon American resources, we may be profoundly grateful that the refining capacity and the transportation facilities were available to enable the United Nations to win the war.

This achievement is a tribute to the vitality of private enterprise.

Encourage Private Interests

Would it not seem prudent and proper in the first instance for the United States to adopt a petroleum policy which encourages private American oil companies to expand interests in foreign fields and to give them the support that is requisite on the diplomatic front?

Such a course recognizes the supreme importance of petroleum in the postwar world. Such a course pays proper tribbute to the genius which has developed the great petroleum industry of the United States during the last half century. Such a course demonstrates the recognition by government of its responsibility in supporting the development of American petroleum reserves in foreign fields.

Such a course corrects the failure of the United States government in the last two decades to take a course that was calculated to protect and preserve the vital concern of America with petroleum.

Before embarking upon government exploration and exploitation of foreign oil reserves with all its fearsome implications in foreign policy, it would seem far better to support American companies abroad in their endeavors to develop world resources and world markets. This is in more substantial accord with diplomatic precedent. This will also afford the opportunity to explore the possibilities of world trade that may be opened up along these lines as American enterprise and business genius are given scope.

Here is a vision to invite the latent energies of America as America becomes part of an ever contracting world. Here is the America of tomorrow.

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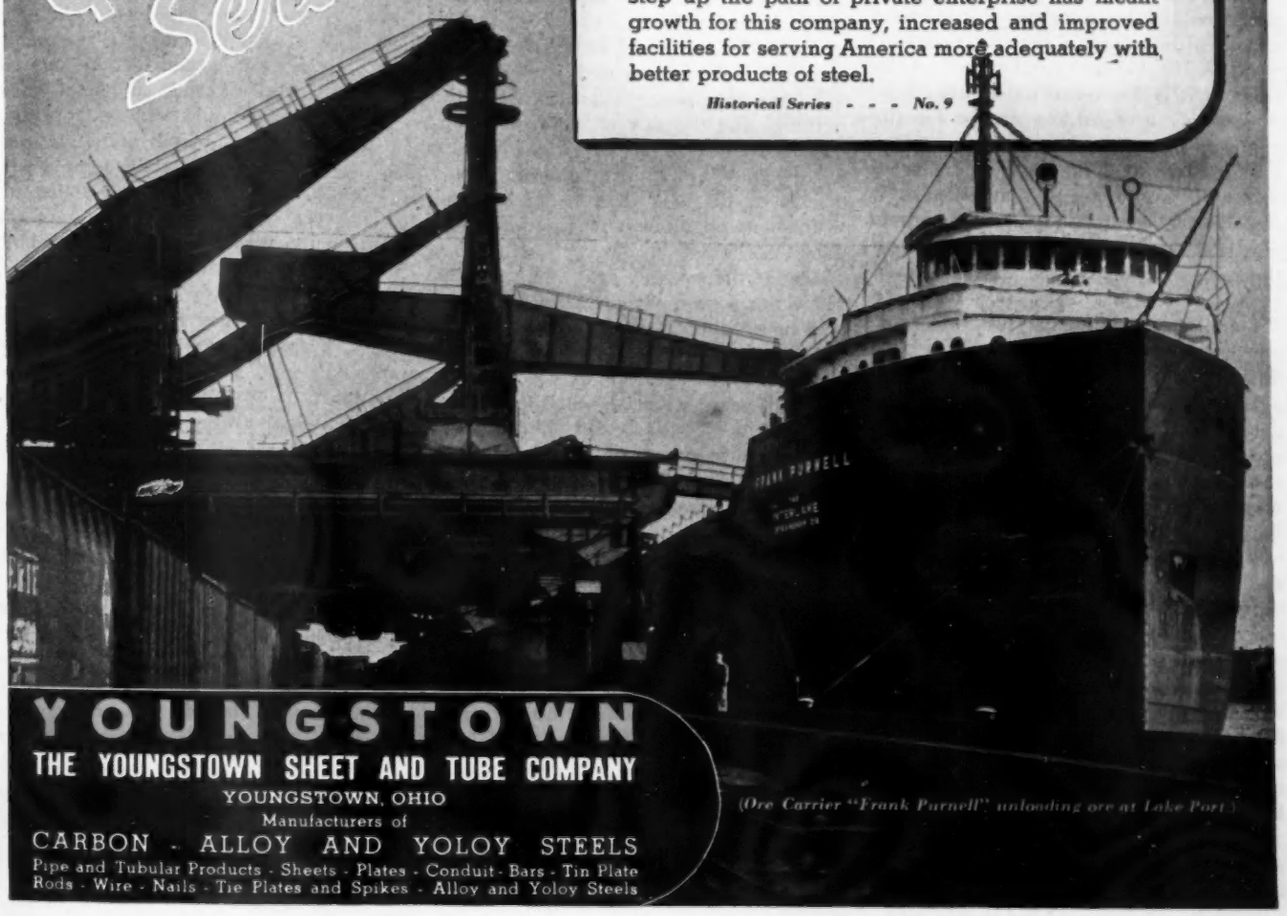

(Ore Carrier "Frank Purnell" unloading ore at Lake Port)

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Taxation of Oil in Place on Ad Valorem Basis

By GLEN E. THOMPSON, Independent Tax Counsellor, Longview, Texas

THERE are two trends of thought regarding the ad valorem taxation of oil in place. One being, that an oil reserve is like any other real estate, and should be assessed on the same basis. While there are those who contend that an oil reserve, being a diminishing asset when it is being produced, can not be treated the same as other real estate for assessment purposes. The latter contention has been approved by the United States Congress in allowing a depletion credit in the federal income tax law taxing the income derived from oil. I should think that this would be proof enough for those who think otherwise. There is no difference in the effect on a barrel of oil, whether it be income tax or ad valorem tax, except that in most instances the ad valorem tax is higher.

Everyone agrees, even the tax expert, that a wildcat lease has very little value, and then only from a speculative standpoint. After the drilling of a well on the lease, if it is dry as in most cases it is, it certainly is worthless except for the value of the drilling equipment, casing, etc., used to drill the well. There is no one who would argue that because it cost $50,000 to drill the well, which is dry, that the lease should be assessed on the basis of the cost of the dry hole. It is, therefore, just as unreasonable to contend that drilling costs should have any bearing in the evaluation of a producing well.

If oil is discovered, then it must be determined as near as possible, the approximate number of barrels in the reservoir under the lease that can reasonably be expected to be produced during the life of the lease, how much it will cost to produce it, and how long and the many hazards to be encountered during its production. If all the combined costs of development and getting a barrel of oil to the top of the ground and ready for marketing to the pipe line, amounts to, we will say for example, 70 cents per barrel, and the oil is selling for $1.00, then the net value of the oil in place in the reservoir would be only 30 cents per barrel.

Considering the sale of such a lease from one producer to another producer, and it is in this light that we must consider what it would sell for at a free and voluntary sale, for as everyone knows 99 percent of the wells in any field are not for sale at any price, therefore, another producer would not pay 30 cents a barrel for the esimated oil in place, but rather, he would pay about 50 percent of the estimated value or 15 cents per barrel. It all depends on the rate the oil can be produced as to how much a producer will pay for it. The longer it takes to produce the lease the less the oil is worth in place, either for sale or tax purposes.

It is immaterial whether the purchaser is an independent operator or a major company, if he is forced to sell his oil to a purchaser as the greater majority of all producers have to do, then he would have to purchase on this basis, because to purchase a lease on any other basis he could not expect to make a profit on his investment. No person properly informed would contend that pipe-line earnings, the profits from the refining and the sale of gasoline manufactured from crude oil, should be used in any way to establish the price of a barrel of oil belonging to a producer who owns no interest whatever in such facilities.

Under the present rate of production there are some fields in Texas that will still be producing oil 50 years from now. Therefore, on the present basis and method of assessment of oil reserves, after 40 years when as much as 90 percent of the oil is produced, the producer would still be paying the same tax as he did at the start when he had his original reserve.

It is contended by some that if the taxpayer is not satisfied with the present method of assessment, then, of course, they could change to the basis of reported sales, and use those values to arrive at the fair value of a lease. Of course this is thrown up as a smoke screen to evade the issue. I do not think they believe this themselves, but it is possible that they do, at any rate in order to disabuse their minds of such an idea, let us assume that a well did sell for as much as $100,000, and we will go a little further and agree that as many as 14 wells were sold at the reported price, or a total of $1,400,000. What of it? What percent is 14 wells of the 25,000 wells in East Texas? Would any intelligent commissioners court or a court of law, for that matter, insist that the sale value of wells involving less than 1 percent of all the wells in East Texas, should control the value of the other 99.9 percent of the wells owned by the hundreds of other operators, both independent and majors, who are not interested in selling their lease at any price, but who must sell their oil to a purchaser at the prevailing price paid by the pipe line.

Let us be fair with both the independent and the major producing operator. Is it right and just to tax the large majority of the producing operators two or three times more than they should pay, because some integrated company pays such high prices for a few wells, and then only because they are in desperate need of crude supplies to meet competition? Should not an operator with $5000 worth of oil under his lease pay a lesser tax than the operator who owns $25,000 worth of oil under his lease, even though both wells have the same daily allowable? Should not both operators have their assessments reduced each year by reason of the oil they have removed the previous year? I think anyone who is not prejudiced and who will give the matter serious thought, will agree this procedure is sound and should be followed.

The proper method of evaluating oil in place and the application of a depletion factor is just as important in ad valorem taxation as it is in income taxation. Any producing operator will tell you that the removal of the depletion credit from the federal income tax laws would ruin him. By the same token, he is hurt as much, if not more, by the fact that he is not getting it in his ad valorem taxes, he has just really never given it a lot of thought. A study of tax costs will disclose that the real reason for the big leak in the profit column, is not income tax as the average person thinks, but the ad valorem tax cost per barrel of oil produced.

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We must not make another mistake and be unprepared for peace. What we do after this war to help a stricken world will be as important as our leadership and industry during this war.

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Determining Probability of Success Of Secondary-Recovery Operations

PART 4

Influence of Fluid Saturation on Secondary Recovery of Oil

PARKE A. DICKEY, Forest Oil Corporation

THE ratio of gas or water injected to the oil produced is an important factor in the economic success of a secondary-recovery operation. This ratio is governed by the fluid saturation in the sand at the start of the operations. A sand containing a high water saturation may be impossible to flood successfully with water because the injected water-produced oil ratio will be high. However, such a sand may be subjected successfully to gas drive because, for any given oil saturation, the presence of water reduces the injected gas-produced oil ratio.

Unfortunately methods of coring now in use result in samples whose fluid contents have been changed by flushing and gas expansion so that it is impossible, except in certain restricted areas, to use the saturation values as determined in the laboratory to estimate the fluid saturation of the sand. However, by means of core analyses, supplemented by the gas, water, and oil-production history of a sand, it is possible to obtain important information on the choice of a method and the possible ultimate oil recovery.

The greater the remaining oil saturation of a sand, the larger the fraction of that oil that can be recovered by secondary-recovery methods. The cost of producing oil increases as the production per well decreases. For these reasons it is economically important to start pressure-control operations as early as possible in the life of a pool. In the case of old pools the longer secondary-recovery operations are postponed, the higher will be the cost per barrel of recovering the oil.

This article is part of a symposium on secondary recovery presented at the annual meeting of the American Petroleum Institute, Division of Production, on November 9, 1943, at Chicago. The symposium consisted of 10 papers. Other papers will be published in future issues.

This article is Part 4 of a series of 10, parts 1 and 2 having been reproduced in the two preceding issues. Part 3 has not been released for publication, and will be presented here when available.

SINCE the early days of the oil industry it has been recognized that the fluid content of reservoirs has a great effect on the productivity of oil wells. No oil man has ever questioned that the three fluids: oil, gas, and water, are intimately associated in the reservoir, and that the relative amount of each present determines the relative production of each in the well. Only recently, however, has the quantitative effect of the amount of each fluid on the production been investigated; and, in spite of a great deal of laboratory and theoretical work, the relationships have not been entirely worked out. Frequently they are complex.

At the outset it should be understood that nearly all producing oil wells penetrate beds of sand that are physically distinct, and often separated by relatively impermeable partings. The physical characteristics of the sand, such as porosity and permeability, are almost always different, and frequently the fluid saturations in these beds also vary. For example, it is quite common for a sand body to be largely filled with gas at the top of the producing sand, oil in the central part, and water at the bottom. Each bed then will discharge principally its characteristic fluid, and the production of the well will be the sum of the three fluids. This statement although, elementary, requires emphasis; because in theoretical discussions and calculations it is usually necessary to postulate a homogeneous medium and sometimes, before the conclusion has been reached, the reader is likely to forget that the theory applies only to a hypothetical and possibly wholly imaginary condition.

All wells produce their fluids under the influence of a pressure gradient existing between the reservoir and the bore hole. Inasmuch as the production of most oil fields is accompanied by a decline in pressure, the individual well production nearly always decreases as the reservoir pressure is dissipated. The capacity of a well to produce may conveniently be expressed by the "productivity index," which usually is defined as the barrels of oil produced per day per pound per square inch drop of pressure in the reservoir. The productivity index is determined by the specific permeability of the sand.[1] It is more exactly determined by the relative permeability of oil, because in many cases the other two phases are also moving in the sand.

Laboratory work has established that the relative permeability of the sand to each of the three phases depends on the amount of each phase present in the sand. Relative permeability is the actual permeability of the sand to the phase

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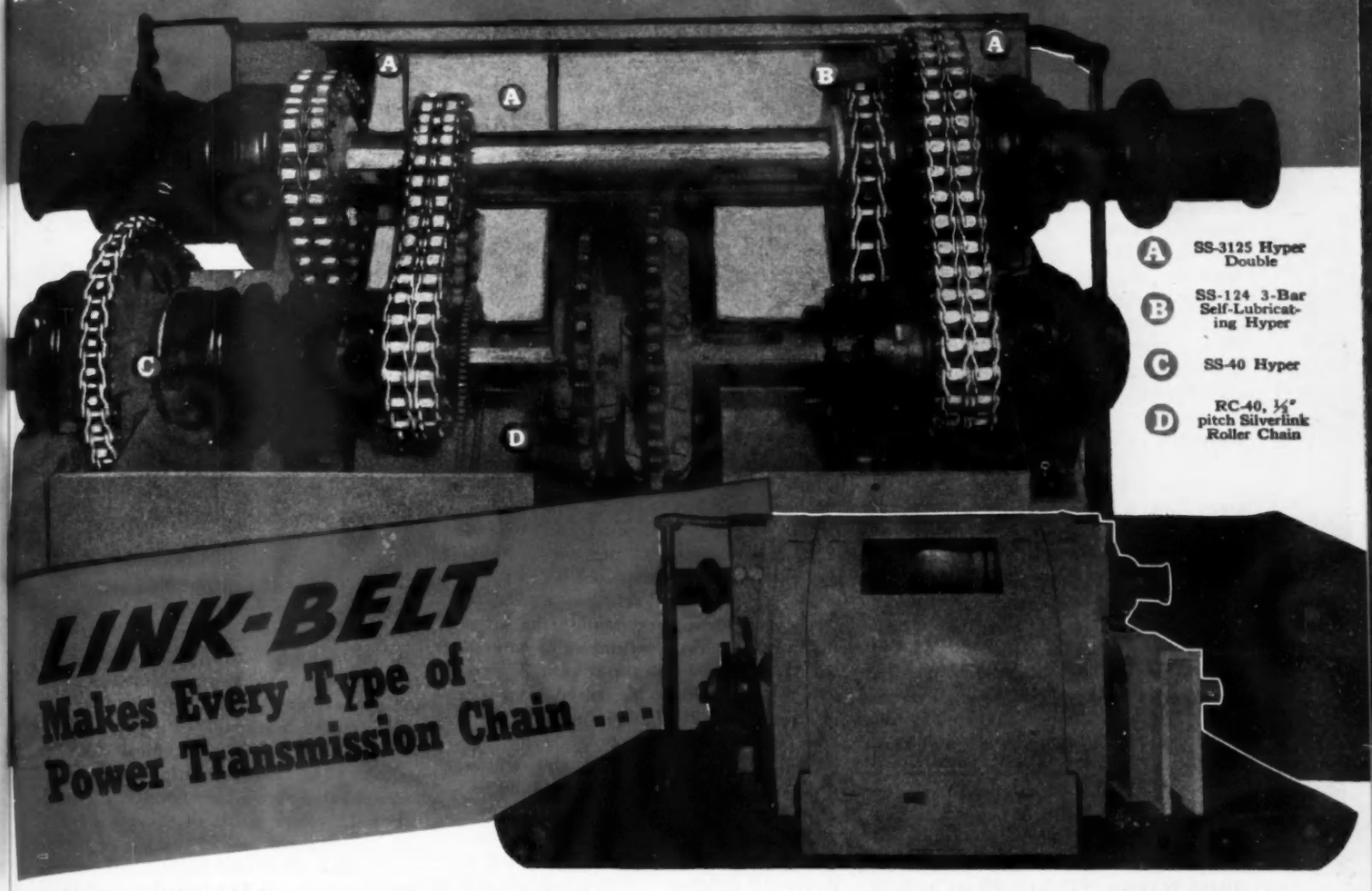

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in question divided by the permeability of the sand if it were saturated wholly with that phase. More simply, if less precisely stated, a sand will be less permeable to oil if it contains both oil and water than if it contains only oil. Numerous investigators have studied the effect of the saturation of the sand to the phase in question on the relative permeability. Wyckoff and Botset[3] have shown that, when gas and liquid flow simultaneously through a sand, the permeability to gas decreases as the liquid saturation is increased. Similarly, the permeability to liquid increases as the liquid saturation increases. They also demonstrated that the gas-liquid ratio is determined by the relative permeabilities of the sand to the two phases, and by their relative viscosities. Leverett and Lewis[3] extened the study to the flow of the three phases: oil, gas, and water. Their work revealed that the relative permeability to oil was less than 1 percent of the specific permeability when the oil saturation of the core was less than 20 percent. Similar relationships hold for the other phases. The conditions where appreciable amounts of all three phases can flow in a sand is thus restricted to a rather narrow range of saturations. This range has varied between 40 to 60 percent water, 25 to 45 percent oil, and 15 to 30 percent gas. Conditions where the volume of gas is several hundred times the volume of liquid flowing are common in oil production. Disregarding the gas-liquid ratio, the composition of the liquid part of the flowing stream will be 10 times as much water as oil for oil saturations between 20 and 30 percent, and 10 times as much oil as water for water saturation between 30 and 40 percent; for saturation ranges between 40 water-30 oil and 55 water 54-oil, considerable quantities of both oil and water will be present in the flowing stream.

The permeability of a sand to gas increases very rapidly as the liquid saturation decreases. For liquid saturations as high as 75 percent the volume of gas in the flowing stream is very high, and a well in this condition will produce at a high gas-oil ratio.

From the foregoing discussion it is apparent that a small change in the fluid-saturation relations in the sand will cause a large change in the relative permeability of the sand to any of the three phases, thereby affecting the relative amount of each phase produced. Under these conditions a sand may contain up to 30 percent or more water and produce none at the well.

Effect of Fluid Saturations on Secondary Recovery

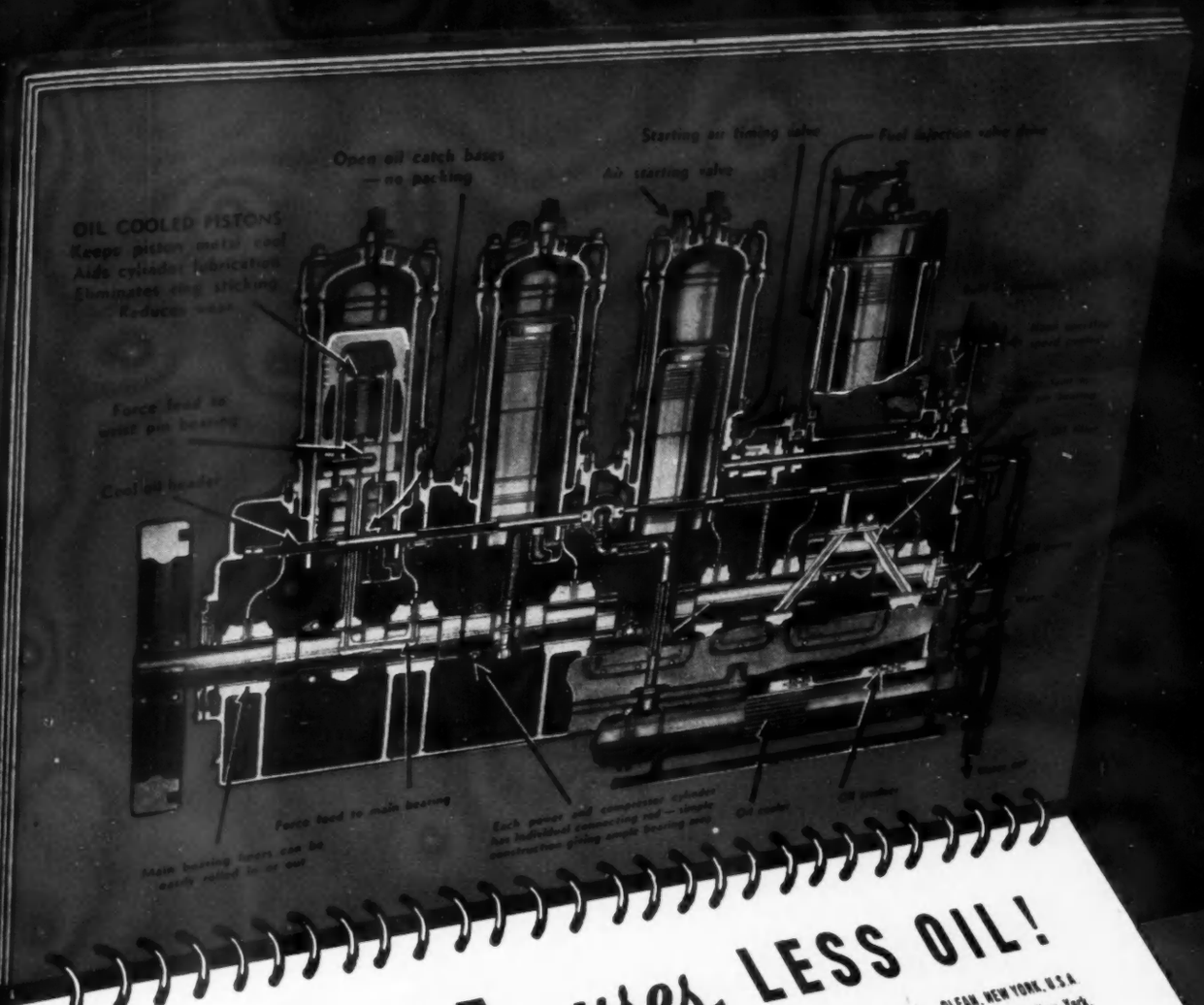
It has long been obvious that the amount of oil which may be recovered from a partly depleted sand by secondary-recovery methods, using either gas or water drive, is dependent upon the amount of oil remaining in the sand. Laboratory work, the results of which have been discussed hereinbefore, has shown that, when a sand contains less than 20 percent oil, practically no oil will flow through it. It is, therefore, impossible as a rule to obtain oil from a sand with 20 percent or less oil saturation. To obtain oil from a sand of even 25 percent saturation might require the passing of large and uneconomic quantities of gas or water through it. Therefore, it may be roughly stated that the oil saturation of the sand may be reduced to somewhere in the neighborhood of 25 percent; i.e., the fraction of the oil in place that may be regarded as recoverable is the actual oil saturation in percent, less about 25 percent, divided by the actual oil saturation. Obviously, it would be very misleading to determine the total oil content in barrels per acre and then assume that a certain percentage of that was recoverable. Neither is it possible to determine the total content of oil in barrels per acre-foot and assume that a fraction of that is recoverable. A sand with a porosity of 25 percent containing 500 barrels per acre-foot has a saturation of 26 percent, whereas a sand of 15 percent porosity containing the same amount of oil has a saturation of 43 percent. If the residual saturation is 25 percent, no oil could be recovered from the first sand, and 210 barrels per acre-foot from the second.

The amount of gas or water which might be driven through the sand in order to recover the oil is almost as important a consideration as the amount of oil that will be recovered. The amount of gas or water injected per barrel of oil recovered will be called the injected gas-oil ratio or injected water-oil ratio. This ratio varies during the life of the flood, becoming very high as more and more individual strata are flushed of their oil. In the following discussion these terms refer to the ratio during the early life of the flood unless qualified.

The injected gas-oil ratio is determined by the ratio of the amount of pore space occupied by gas to that occupied by liquid. The injected gas-oil ratio should vary geometrically with the gas-liquid-saturation ratio in the sand. At a liquid saturation of about 80 percent the gas-oil ratio will be about 5 cubic feet per barrel, whereas at a liquid saturation of about 60 percent the gas-oil ratio will be about 5000 cubic feet per barrel (without taking into account the gas that may be dissolved in the oil). These figures are based on deductions from laboratory work,[4] whereas the injected gas-oil ratios in actual operations are probably greater. They illustrate, however, the large change in injected gas-oil ratios caused by a small change in liquid saturation. It makes very little difference whether the liquid is water or oil. Consequently, if the liquid were all oil, practically none could be recovered even if the saturation were 30 percent. If the liquid saturation was 60 percent, of which 30 percent was oil and 30 percent water, considerable quantities could be recovered at reasonable injected gas-oil ratios. If the liquid was 70 percent, of which 40 percent was water and 30 percent oil, the oil could be recovered at still better injected gas-oil ratios. Therefore, the oil saturation can be reduced to a lower value by gas drive if the sand also contains considerable quantities of water.

If water is used as the driving medium, it is the injected water-oil ratio that will determine the success of the operation. This ratio depends on the relative saturation of the sand to water and oil. It has been suggested that the relative saturations may be quite critical.[4] If water is injected into a sand that already has a greater permeability to water than to oil, because it has a greater water than oil saturation it may be expected that more water will flow through the sand than oil. The oil that is recovered, therefore, will be obtained by a flushing action, at the expense of a high water-oil ratio. Inasmuch as water is more expensive to handle than gas, volume for volume, early injected water-oil ratios greater than 2 or 3 to 1 are economically impossible. (The usual limiting injected water-oil ratio on a water flood is about 20 to 1. However, most of the water is produced near the end of the life of the project from watered-out beds producing very small quantities of oil, while the oil is mainly coming from less permeable beds not yet flooded. An initial injected water-oil ratio of 2 or 3 to 1 would probably be considered uneconomic.)

If, on the other hand, water is injected into a sand that has a higher permeability to oil than to water, because of having a greater oil than water saturation the oil will be concentrated ahead of the advancing water and a "bank" will be formed. This bank will be driven through the sand by the water. Ahead of the water, therefore, principally oil will be flowing, and the oil will occupy most of the pores formerly occupied by gas, so that the oil saturation will become very high. As the water reaches a given point in the sand, the water will occupy the pores formerly occupied by oil. The water saturation and, therefore, the injected water-oil ratio will increase rapidly, so that behind the bank only very small amounts of oil will be flowing.[5] On this basis, it seems prob-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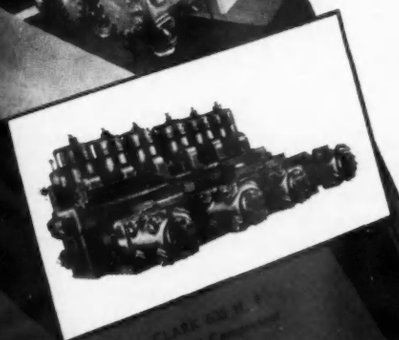

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able that sands containing so much water that they are more permeable to water than to oil cannot be economically flooded by water drives, although they may be operated under gas drives.

Although existence of critical gas and water saturations which determine the amount of oil recoverable by secondary methods, as well as the injected gasoil or injected water-oil ratios necessary to recover it, may be inferred from laboratory data, it is impossible as yet to define their actual values.

The viscosity of the oil enters directly into the equation defining permeability. Doubling the viscosity of the oil would double the water-oil ration required to recover it. The effect of viscosity is thus much less than that of saturation, inasmuch as a decrease of oil saturation of only about 5 percent would have the same result.

It is probable that the pore spaces in well consolidated sands, such as those of Pennsylvania, are not similar to the interstices between close-packed spheres, but more like solution channels in limestones. If this is the case, it is possible that there are a few rather large channels or tubes through which most of the fluid movement will take place, and numerous smaller channels from which the fluids cannot be driven. This textural condition also has been noted in consolidated sands outside the Appalachian area. In such sands the residual oil unrecoverable by secondary-recovery methods may be much higher than in sands with a more uniform pore-size distribution.

It is generally held—and it is certainly logical to believe—that when water and oil are both present in a sand, the water wets most of the solid surface and occupies the smaller pore openings. Water is usually able to displace oil from either clay or silica surfaces, and it is reasonable to suppose that it has had ample opportunity to do so in any oil sand. However, there are certain sands that contain very little water, and it is likely that in these the oil wets a large proportion of the solid surface. The residual oil after flooding might be much higher than normal in these sands. Some engineers believe that the oil may wet a large amount of the solid surface even in sands containing much water. Some method of ascertaining the true condition would be very helpful to a true evaluation of core analyses. The subject involves the very complex phenomena of surface chemistry, and there is little hope for an immediate clarification, although research is in progress.

The connate or interstitial water is determined in cores either by distillation at high temperatures, in which case a correction for the water of crystallization of certain minerals is necessary, or by extraction at low temperatures, in which case such a correction need not be applied. Some sands, however, contain a large amount of clay, which is able to absorb water and hold it so firmly that it is effectively removed from the fluid part of the system. The analysis of a sand containing a large amount of clay might show a high water content, although only a small amount of this water is mechanically effective. This is particularly true in sands where the cementing material is bentonitic such as the "dry" sands of Ward County, West Texas.

In view of these additional factors, it is impossible to predict in advance the injected water- or gas-oil ratios from the fluid saturations. Experience as well as theoretical considerations, however, indicates that a sand containing substantially more water than oil probably will not be susceptible to water flooding, whereas a sand with a low liquid saturation may respond very poorly to gas-driving.

Determination of Fluid Saturation

Although no one would now question the necessity of taking cores before the start of a secondary-recovery operation, and during its development, the interpretation of cores is still a difficult matter. Opinions as to the reliability of fluid saturations as ordinarily obtained by core analysis differ to an extraordinary degree. Some engineers in the Eastern and Mid-Continent fields seem willing accept the fluid saturations as determined by the cores as precisely the same as those in the sand, basing their calculations and predictions on these data without any question of the reliability of the cores. Others recognize the possibility of contamination, but feel able to allow for it, presumably by means of empirical factors based on the performance of actual operations.[6, 7] Still others report that core drilling with a conventional barrel does not permit an evaluation of the actual fluid saturations of the sand; that, in general, the oil saturation will be the minimum residual amount of oil left after water- and gas-expansion drives.[8, 9] It is obvious that the reliability of corse analysis depends on the properties of the oil sand. The depth of the sand is another important factor. Outside the Bradford field, cores taken from depths greater than 1000 feet frequently, if not usually, have shown evidence of flushing. During coring there is a tendency for the water used as the drilling fluid to penetrate the sand downward ahead of the bit, displacing the oil exactly as in a water drive. This will tend to reduce the oil and increase the water content. The effect of this action will be less in sands of low vertical permeability, and in sands of high reservoir pressure. Attempts to evaluate the amount of this flushing ahead of the bit have been made by using a tracer solution, so that the amount of contamination by drilling fluid can be measured. Such methods will give the amount of tracer fluid in the core, but not the amount that has entered and passed through it or bled back out. Another method which is gaining favor is the use of oil-base muds as drilling media during coring. In a normal sand it is probable that the permeability to water is low; consequently, the oil will enter and flush the sand without greatly changing the water content. The water saturation thus can be more reliable determined, but the oil saturation will be altered. Recent work on the comparison of coring technique and fluid saturation in the laboratory indicates that flushing generally occurs, even with the use of oil-base muds or low water-base muds. It takes very little water to flush a core, and cable-tool cores with only a small head of water in the well are also likely to be flushed.

The pressure of the fluids in the sand is generally higher than atmospheric, so that there is a reduction in pressure as the core is withdrawn from the hole. Inasmuch as most sands contain considerable quantities of gas, both dissolved in the oil and free, this gas will tend to expand as the core is withdrawn, expelling from the core considerable quantities of liquid. If much gas is dissolved in the oil, the volume of the oil will also be diminished. It has generally been assumed that the oil is expelled more than the water, and this is probably the case in sands in which the water saturation is less than the oil saturation. On the other hand, it is entirely possible for water to be expelled also, particularly in sands that contain a large amount of connate water. A core barrel, which can be withdrawn from the hole while the bottom-hole pressure is maintained, has recently been developed,[8] and shows great promise. Preliminary tests indicate that the analyses of pressure cores are much more indicative of true sand conditions than these conventional cores.

Electrical logs are of great value in supplementing core analyses, especially when core recovery is poor, or for other reasons the depth measurements are uncertain. In the early days of electrical logging it was thought that this method would give reliable indications of fluid saturations.[10] It has since been found that the electrochemical phenomena whereby the fluids on the formations give rise to the electrical logs are very complex, and at the present time are not thoroughly understood.[11] However, electrical logs, like cores, can be used with reasonable assurance in regions where they can be calibrated with cores and with actual well performance.[12] There is no doubt that the electrical

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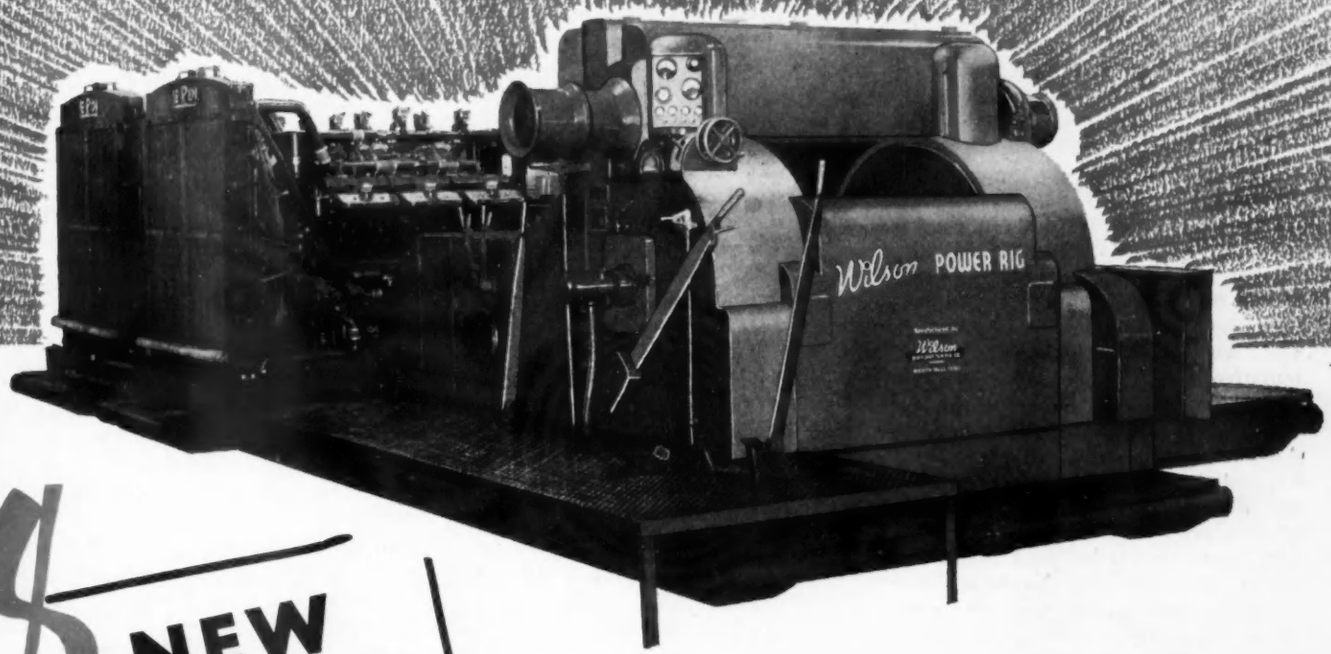

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responses are governed by the fluids in the sand, or that much can be deduced from them. Recently two investigators reported success in determining the connate-water content of sands by means of electrical logs.[13, 14]

At present it is very difficult to use cores to estimate fluid saturations except in certain fields or restricted areas. In the Bradford field of Pennsylvania the oil recovery per acre by water flooding usually can be predicted quite accurately from sufficient core analyses, and there seems to be little question that in most cases the cores reflect rather closely the actual fluid condition in the sand. The Bradford sand is a very dense, hard, quartzite with a low horizontal permeability (2 millidarcys to 50 millidarcys, averaging 10 millidarcys), and a laminated texture which results in a negligible vertical permeability. There is thus little flushing action ahead of the bit. The pressure in the sand is low, so that there is little tendency for the expansion of gas to expel the fluids as the cores are withdrawn.

In the Venango district of Pennsylvania conditions for obtaining representative cores are somewhat less favorable, but possible recoveries by gas drive can be estimated in a relative manner. Fair recoveries can be obtained from sands whose cores show an average oil saturation between 25 and 30 percent, and poor recoveries from sands whose saturation is less than 20 percent. The permeability in this district is higher and more variable, and the water saturation is consistently higher. In certain more permeable sands flushing is unquestionably active, as good recoveries have been obtained from leases whose cores showed less than 20 percent oil saturation. The general high water saturation probably tends to restrict the flushing action to the water in the core, leaving the oil relatively unaffected, so that a fairly reliable estimate can be made.

In the Bartlesville sand area of Northern Oklahoma and Eastern Kansas, fluid saturations as determined by cores are generally considered reliable, and predictions of water-flood recovery based on them are frequently realized in practice.

At the present time cores can be used with assurnace to determine fluid saturations only in certain sands in the areas mentioned, unless there are some other similar districts unknown to the author. Even in these areas extraordinary conditions of very high or subatmospheric pressures, high interstitial water, or high permeability may give rise to very misleading values. In no case, therefore, should core analyses be used to estimate fluid saturations without some additional data.

Until better coring technique has been perfected, the actual production of the well probably gives the most reliable indication of the fluid content when combined with studies of bottom-hole samples. As laboratory data accumulate, it will probably be possible to estimate the fluid content of a sand quite accurately from its productivity index if the physical characteristics (porosity and permeability) of the sand are known. An interesting and extremely valuable use of this sort of data has been made by Higgins.[15] Obviously, if both a water and oil sand are exposed in the same well, the resulting produced water-oil ratio cannot be used to estimate the fluid saturations. This condition, although common, is by no means universal in the Mid-Continent and Appalachian areas where secondary-recovery is practiced. In most of the fields of West Virginia and Pennsylvania core analyses and other considerations indicate that, as a rule, the producing sand has rather similar fluid saturations throughout. Departures from this rule can be recognized easily from general geological considerations. They include places where intrusive water from old wells has flooded portions of the sand, upstructure areas of high produced gas-oil ratios, and downstructure areas of high produced water-oil ratios. In such places it may be assumed that certain parts of the sand body have markedly different fluid saturations from the rest.

Saturation Values in Certain Oil Fields

The considerations outlined in the preceding paragraphs suggest that actual fluid-saturation values as determined from cores cannot be used except in restricted areas where secondary-recovery operations have progressed sufficiently to determine empirically a relation between the values and actual recoveries. It would be very misleading to attempt to average, or even compare, saturation values in different districts.

Insufficient data are publicly available to compile a table showing the average oil and water saturations as determined by cores, and the actual recovery per acre, for a large number of projects. Such a table would be very illuminating and valuable, subject to the reservations just stated; and it is hoped that some commercial laboratory or government organization may see fit to prepare one.

In the Bradford field of Pennsylvania, where core analyses have been valuable and extensively used, oil saturations generally range from between 40 and 50 percent. Saturations of less than 40 percent are fairly common. The figure 38 percent is sometimes considered the minimum saturation commercially floodable, but it is generally conceded that other considerations are important. It is probable that in some instances sands with a lower saturation are being flooded, but a saturation of less than 35 percent would be regarded as distinctly unfavorable.

Water-saturation determinations vary somewhat according to the laboratory method used. They generally are considered to average between 20 and 25 percent throughout the field, and higher values are found only in areas flooded accidentally or intentionally by water, and in certain areas around the margin of the pool where edge-water conditions exist. The edge-water zones are quite definite, but the water has never encroached as the oil was withdrawn. Normal wells never produced appreciable amounts of water.

In Bradford very poor recoveries have been obtained by gas drives. Gas-drive attempts were given up many years ago when the potentialities of water flooding became apparent, and they were probably rather ineffective. Water drives have been notably successful. Recoveries range between 100 and 200 barrels per acre-foot. Several cores have been taken in areas flooded by water. Residual-saturation values after flooding are generally around 25 percent, except in beds of low permeability through which the water had not passed. The banking effect of the water has been noted in certain cores in which oil saturations well over 50 percent were obtained.

In the Venango district of Pennsylvania oil saturations range between 20 and 35 percent. These may be considered less reliable than the Bradford determinations because of the greater permeability of the sand. Water saturations range between 40 and 60 percent, and are nearly always higher than the oil saturations. Wells naturally produce several times as much water as oil. Some of the produced water is probably intrusive, from old wells that had not been properly plugged, but a large part of it is unquestionably original connate water. Numerous attempts to water-flood have been made in this district. None of them was economically successful, and in nearly every case the water production of the wells increased with no sensible increase in oil production. However, in the early days of the field accidental water drives frequently resulted in temporarily increased oil production. It is possible that water drives were more effective when oil saturation was higher. The actual recovery per acre is impossible to determine, but old accounts agree that it was poor. The poor recovery may be largely accounted for by the haphazard character of the flood, and the presence of highly permeable beds through which the water passed, leaving the less permeable beds untouched.

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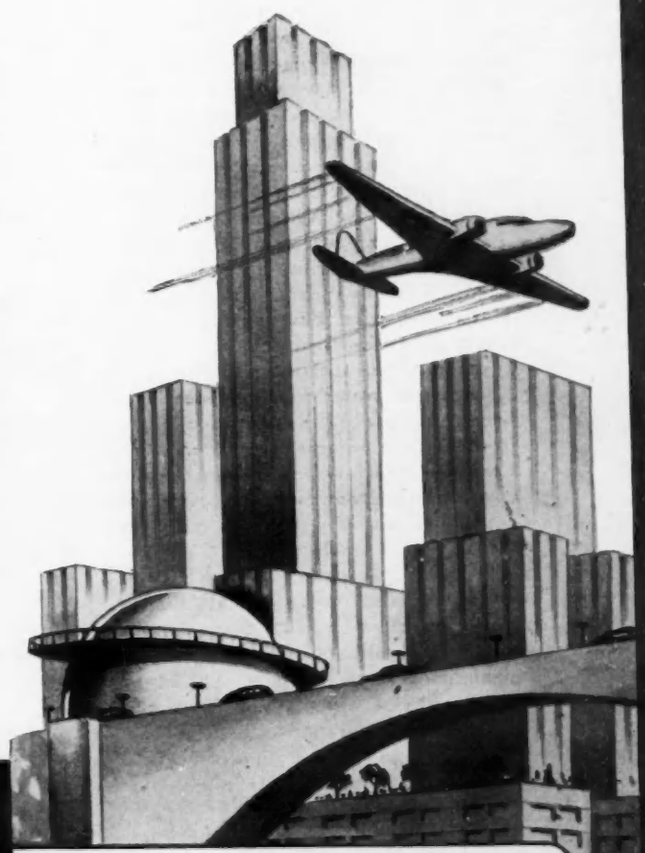

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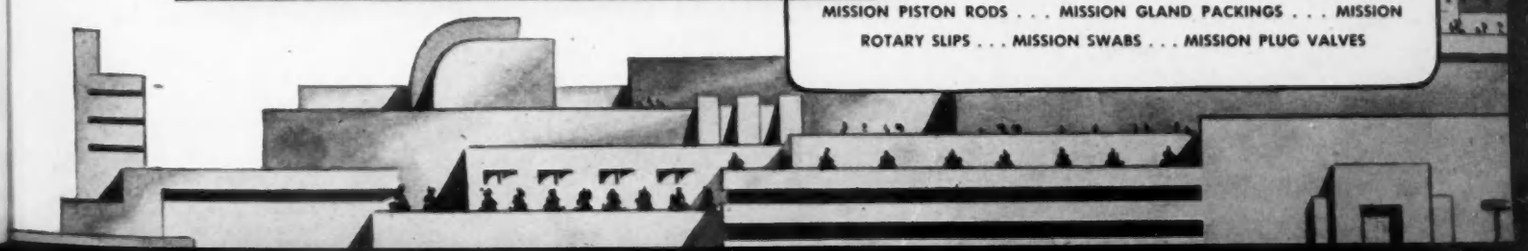

notably successful in the Venango district, especially in view of the very low oil saturation. Recoveries as high as 100 barrels per acre-foot have been obtained, and 50 barrels is obtained quite frequently. This amounts to a reduction in saturation from 30 to 25 percent, or even lower. Even pools that had been accidentally flooded and totally abandoned have been dewatered and have responded excellently to air drives.

In Southwestern Pennsylvania and West Virginia few cores have been taken. Gas drives are in operation in numerous fields, especially in West Virginia. Most of these involve widely spaced input wells, and they are probably exceedingly inefficient. Not nearly enough cores have been taken to correlate the fluid-saturation values with actual recoveries. A few cores show evidence of flushing.

Some fields in Southwestern Pennsylvania and West Virginia show very large amounts of connate water, notably the Hundred-foot and Big Injun sand pools. In these sands it seems likely that the water is truly interstitial, and not from beds distinct from the oil pays. Accounts agree that wells made large amounts of water from the time they were drilled, and that a well that made little water also made little oil. In many instances the water and oil production declined together. Few hundred-foot pools have been repressured. There are several gas-drive projects in the Big Injun. Among these the Sistersville pool has been quite successful. There are no extensive water-flooding projects in West Virginia.

In Ohio gas repressuring, and especially air repressuring, have been practiced for many years, notably in the Marietta district. Few cores have been taken, and the analyses of none are available to the author. In the Chatham-Lodi district water flooding recently has been successful. Oil saturations range from 40 to 45 percent, and water saturations are about 30 percent, so the fluid conditions are very similar to Bradford —although porosity, and especially permeability, are much greater.

In Oklahoma water flooding has been very successful in the Nowata district. Here also fluid saturations are similar to Bradford, although porosity and permeability are much higher. Oil saturations range between 40 and 50 percent, with water saturations about 30 percent. Here an oil saturation of below 35 percent is regarded as definitely unfavorable.

Similar conditions exist in the waterflood districts in Eastern Kansas. Oil saturations are generally above 40 percent, and sometimes range to over 50 percent. Water saturations are nearly always less than the oil saturations.

In Texas core data on 2 water-flooding projects published by Fancher[16] suggest that the cores may have been flushed, as the oil saturation of 22 to 24 percent is below the minimum residual saturation after flooding in other areas.

Conclusion

Perhaps the most important single fact that determines the success of a secondary-recovery operation is the amount of oil recoverable. This amount is determined by the amount of oil in the sand. Possibly the next most important fact is the injected gas-oil or injected water-oil ratio necessary to recover this amount of oil. These ratios are determined by the gas and water saturations of the sand. It is clear that if these quantities were determinable by cores in advance of the heavy development expense incident to either gas or water drives, much of the hazard would be removed from secondary-recovery operations. The importance of further work on the fluid relationships in oil sands as they affect productivity indices, and on methods of obtaining representative cores, cannot be overemphasized.

Another conclusion to be derived from a study of fluid saturations is that the higher the oil saturation, the larger the percentage of oil in place that is recoverable. This fact needs a great deal more emphasis than it has received. The lifting cost of oil is usually a large fraction of the cost of production. The lifting cost depends, more than on anything else, on the rate of oil production of the well. Wells with low rates produce oil at disproportionately high lifting costs. As a rule, gas or water drives are not initiated until the economic limit has been reached, and the lifting cost has attained the selling price of oil. It would obviously be much better to start secondary-recovery operations while the wells still were producing substantial amounts of oil. The ultimate recoverable oil would then be obtained much more quickly and, therefore, much more cheaply. In many cases much more oil could be obtained. Perhaps the most obvious example is a field whose upstructure wells produce at a high gas-oil ratio. Many such fields are now allowed to produce gas from the high gas-oil-ratio wells, partly for the oil and partly for the oil gas. The oil in the more richly saturated parts of the pool is migrating upstructure, and ultimately may spread itself so thin by wetting dry sand that it cannot be recovered by any secondary-recovery method. Gas should be either recycled and driven downstructure, resulting in the recovery of the same gas with large amounts of oil, or a water drive should be started downstructure before the gas pressure has been removed.

In fact, it might be possible to start both gas and water drives simultaneously after the discovery and definition of a new pool. Gas should be reinjected at the top of the structure to maintain the original pressure, and water should be injected downstructure equal in volume to the oil removed and the gas used for fuel. If this were done, it might be possible to reduce the oil saturation in the sand to the neighborhood of 20 percent, and recover all the oil by flowing without ever having to install a pump. The oil would be recovered at a fraction of the cost per barrel of present without ever having to install a pump. The oil would be recovered at a fraction of the cost per barrel of present methods, which involve a short period of flowing and a long period of expensive pumping. Lifting costs of the oil during the initial flowing period are only a very small fraction of the costs per barrel of the oil produced during the long pumping period. If some form of primary pressure control were initiated intelligently, with due regard for the geological conditions, early in the life of a pool, the total lifting cost per barrel would be on the order of the flowing costs, and the ultimate recovery would be greatly increased.

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EQUIPMENT IN WORLD-WIDE USE

Southeast Georgia—North Florida Area Getting Big Exploration Play

By DON L. CARROLL, Staff Writer

Number of geological and geophysical parties active in area where geology is promising; recent strike in Florida is not related but is having stimulating effect

THE long-awaited campaign of intensive exploration of large new areas considered by leading oil geologists as notably favorable for the discovery of important new reserves, is now getting under way, as major companies recognize the actuality of serious depletion in proved areas.

The most significant move toward a concerted effort to establish production where none has been found before is now taking place in Southern Georgia and adjacent parts of Florida, where at least seven major companies are finishing leasing and optioning campaigns involving probably as much as 8,000,000 acres already distributed over 35 counties.

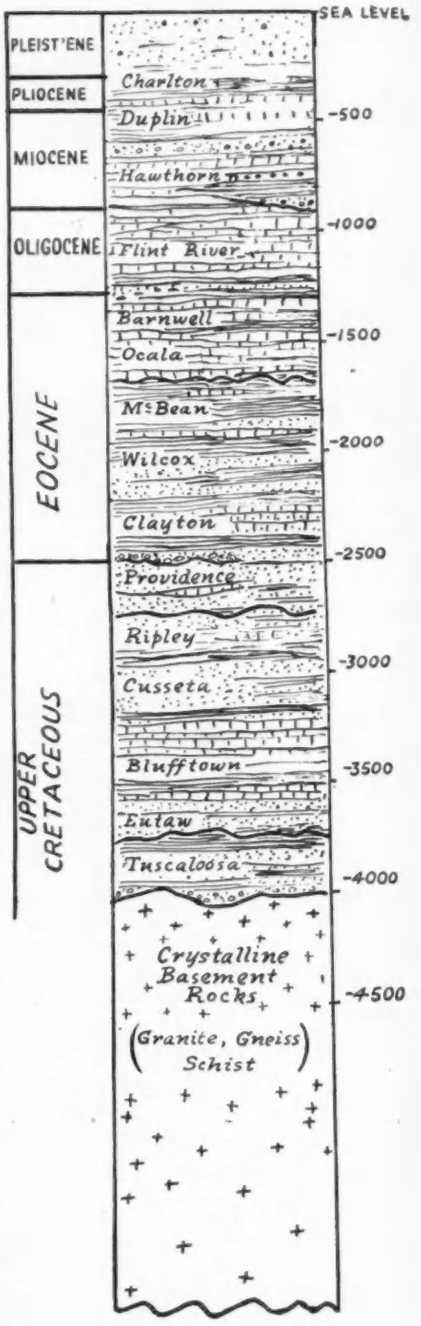
A number of geological and geophysical parties are giving the territory a thorough going over, some of them having been active there for the past six months. Particular interest is being shown in land lying to the east, south and west of the Okefenokee Swamp, although the speculative play is far ahead of company interest to date. A few drilling locations have been staked, but active drilling is not likely to be under way until after the first of the year.

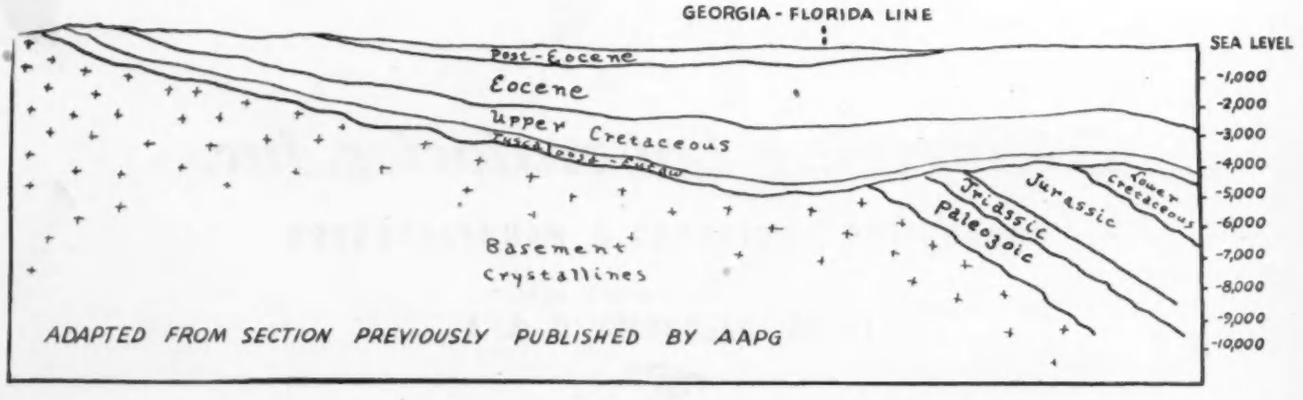
The Georgia play is not related to the activity in Central Florida, touched off by Humble Oil & Refining Company's discovery in Collier County a few weeks ago, and still an unknown quantity as regards production possibility and further tests in the Everglades region. Humble has made another location there, however, and will undoubtedly put down another well in spite the great expense involved—probably amounting to some $300,000 before completion.

Geology Promising

There is ample reason to expect that something worthwhile will come to light as a result of the activity farther north, in the Georgia-Florida boundary region, since the geology of that territory is very promising. General stratigraphic and structural conditions are ideal there for oil accumulation, and its actual presence has been confirmed by previous non-commercial wells, surface shows and escaping gas. Showings have been encountered in the Hawthorn (Miocene), Wilcox (Eocene in Gulf Coast region), and Tuscaloosa - Eutaw (Upper Cretaceous) formations.

The sedimentary rocks of South Georgia are dominantly marine and are





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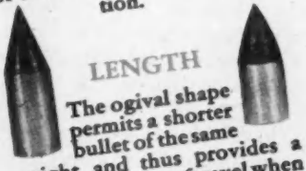

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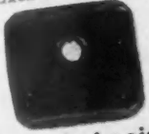
The center of gravity is forward to keep the bullet traveling in a straighter path.

PERFORATION



The ogival-point flows displaced metal back into a tight bead to produce a cleaner perforation with less danger of damage to tools run after perforating.

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You can see for yourself the advantages of the new Lane-Wells "Steelflo" Ogival-Point Gun Perforator Bullets as compared with conical point bullets. These advantages, which result in greater power, cleaner perforations, deeper penetration and better producing conditions have come from field and laboratory research maintained continuously for more than eleven years.

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- **Samples will be run for tolerance, fit and coverage inspection and for approval submission.**
- **If transportation problems dictate installation of your own processing plant, we can furnish quotations on equipment and pertinent processing costs.**
- **Our facilities are offered as a pilot plant pending installation of your equipment and for processing samples for your initial submission.**

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is a chemical treatment for iron or steel, resulting in a surface that can be stained, oiled, waxed or painted and is substantially resistant to rust.

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is a chemical treatment for iron or steel friction surfaces, in mechanical assemblies, that improves bearing properties, retards wear and galling.

typically coastal-plain types. They rest on a basement of granites, gneisses and schists that come to the surface along a line stretching from Columbus, through Macon, to Augusta. Southward and southeastward from the outcrop line of these crystallines the sedimentary beds crop out in sequence, with southward dips, and attain more and more thickness toward the deepest part of the basin near the Florida line. At the Atlantic edge of the basin the beds are some 5,000 feet thick; but as the basin becomes deeper to the westward they attain approximately 7,000 feet of expression in the southwestern corner of Georgia.

It is worthy of careful note that these marine beds overlap each other all the way down through the section, thus creating localized traps that deserve as much attention as do those representing dip interruptions or actual closed structures. It should also be pointed out that the basement surface is probably far from being merely a warped plane, as geophysical studies may already have shown, and that buried ridges may be present in number in the region, forming stratigraphic traps of first rank within the sediments above.

The basement rock surface levels off and ends abruptly almost exactly at the Florida line, where Paleozoic and Mesozoic rocks come up at a sharp angle to form an angular unconformity against the overlying Tuscaloosa-Eutaw beds that continue on down into Florida. The truncated edges of these older strata may likewise constitute the loci of depositional "structures" of the stratigraphic type. If their topographic expression at depths of four and five thousand feet can be mapped geophysically such a possibility may prove to be the fact.

In addition, the possibility should not be overlooked that oil accumulations may be present along the former outcrop areas of these truncated beds, since the Upper Cretaceous sediments that mantle them may furnish an impervious cap. These general geological conditions extend well down into Northern Florida.

The oil-producing possibilities of the region have excited the imagination of geologists at various times for many years. All the sedimentary beds in the province belong to systems that have been found to contain oil in other parts of the United States, except for a scant 5 percent or so of non-marine strata at the surface. Stratigraphic traps, overlaps, and orthodox structures of favorable category are known to be present in number. There are possibilities for both deep and shallow production; and there is the further incentive inspired by the fact that little or no wildcatting has been carried on in the area, or anywhere near it.

A geologic section is submitted in an

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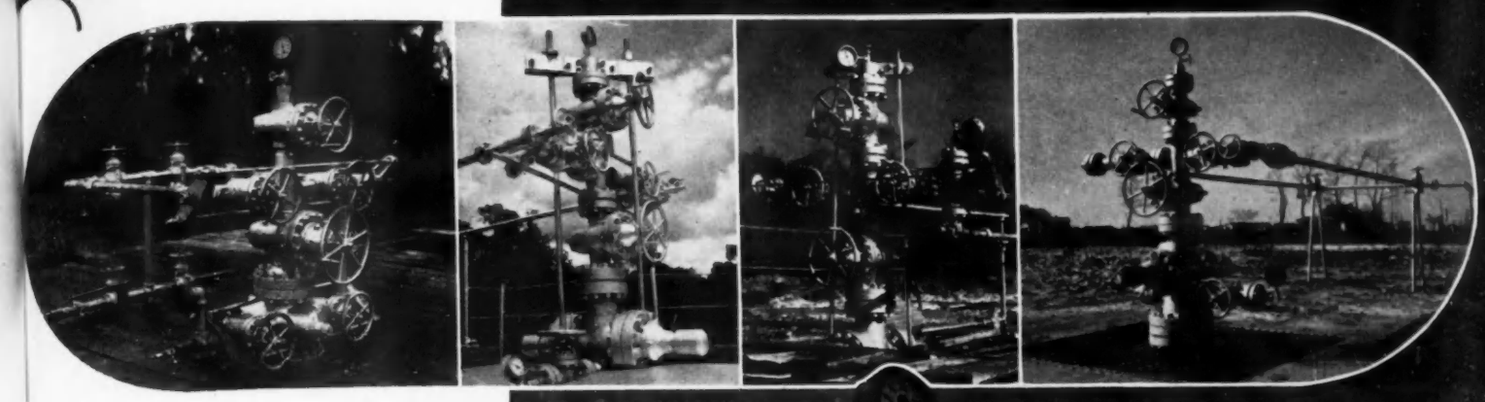
accompanying sketch for the convenience of the reader in orienting himself in a generalized manner as to the stratigraphy of the area discussed. It is offered merely as a tentative guide and as a possible average picture of conditions. It will have added utility, however, if some correlations are suggested in terms of trans-Mississippi Valley-Eastern Texas horizons.

Assuming that the Georgia Tuscaloosa is the virtual equivalent of the Woodbine farther west, the remaining Upper Cretaceous beds, above the Eutaw, can be correlated with the Selma Chalk series of the lower Mississippi Valley. The Clayton would thus be considered as the eastern expression of the Midway Group. The Georgia Wilcox is very likely of the same age as the Middle Wilcox of the Southeast Texas area. At the risk of provoking considerable argument it is suggested that the Claiborne Group of Texas and Louisiana is represented in Southern Georgia only by the McBean formation, and that the latter will be found to check rather closely with Sparta-Crockett transition beds in the Cook Mountain series. An evident unconformity on the McBean surface indicates the erosional removal of much of whatever Upper Claiborne equivalent was originally present that would correspond to the Yegua section.

It will be noted that the Ocala Limestone is placed in the Eocene, where it may or may not belong, depending upon the results of more detailed paleontological work now under way that may show it to be of Oligocene age. If it is Eocene, though, it must then be correlated with Upper Jackson beds, and the overlying Barnwell strata would be gradational equivalents of the Vicksburg and lower Frio beds.

The Flint River Limestone has been regarded as the equivalent of the top Vicksburg beds. If this is the actual case the Barnwell could not possibly be correlated with the same or slightly higher strata farther west. It seems likely, though, that the Hawthorn formation is of the same age as beds that occur just below the Hattiesburg Clays. This would make the Duplin almost certainly the eastward expression of the Pascagoula. The Charlton may or may not be Pliocene. This remains to be proved. If it is Pliocene, though, it would correlate with the Citronelle formation.

Companies actively engaged in optioning, leasing, exploration and prospecting in the South Georgia area include Standard Oil Company of California, Humble Oil & Refining Company, Sun Oil Company, Tidewater Associated Oil Company, The Pure Oil Company, Sinclair Prairie Oil Company, and Gulf Oil Corporation, as well as several smaller companies.



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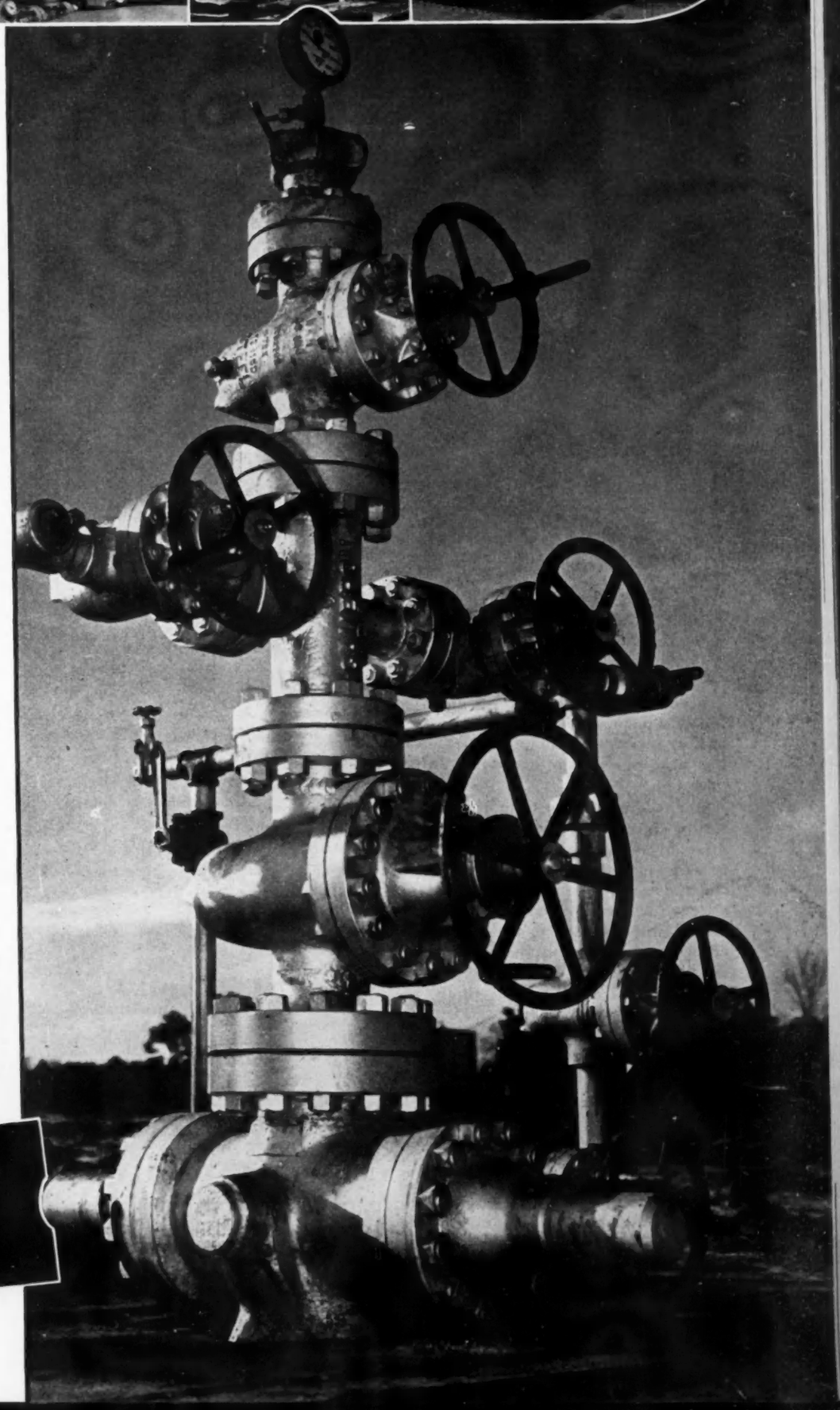

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PRACTICAL OPERATING *Hints* FOR THE PRODUCTION MAN

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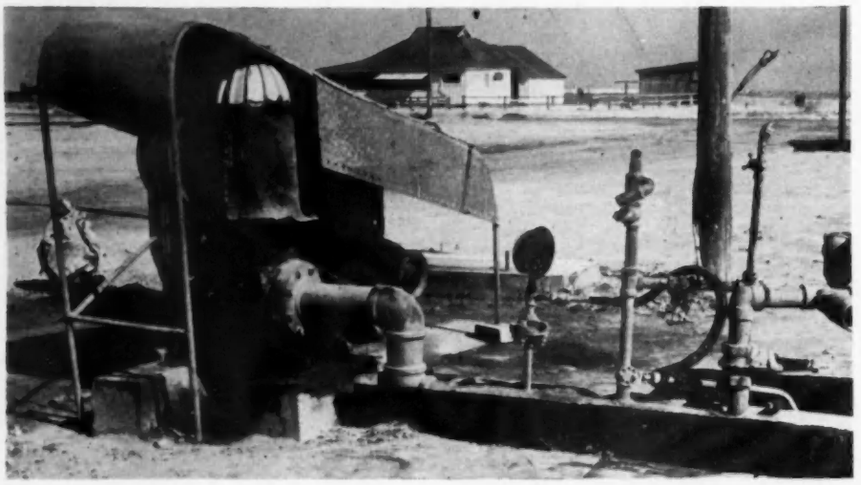
1. EQUIPMENT CARE

Drive Life Extended By Overhead Cover



Sucker-rod frame and light tank sheet metal forms readily removable guard and watershed for exposed V-belt drive on water well equipment without hampering operation or care.

MOST field pumping equipment is designed for outdoor operation, but such units as V-belts, even when cured for withstanding sunshine and rain, give longer and more uniform service if safeguarded. Care must be taken to avoid too closely enclosing the belts, however, as they require ventilation to carry away the heat of friction generated during operation.

One field unit secures the desired protection for pump, motor, and V-belt drive, by forming a frame of sucker rod so as to span the set-up, with a top and short side members of light scrap tank plate welded on. The rod frame is braced to add wind resistance, the straight or vertical ends of the two main rods being set into sockets in concrete blocks or other material so as to be readily removable if the unit requires servicing.

By burying the base blocks adjacent to the foundation of the unit after properly spacing the drive within its shield, security against possible damage through shifting of the frame or shield is obtained.

The sheet metal cover is tack-welded to the rod frame at intervals, it not being necessary to run a continuous bead to insure maximum desired stiffness in the structure. The top sheet may have the edges rolled to fit over the side panels, so as to prevent serious rust formation between sheets and supporting frame.

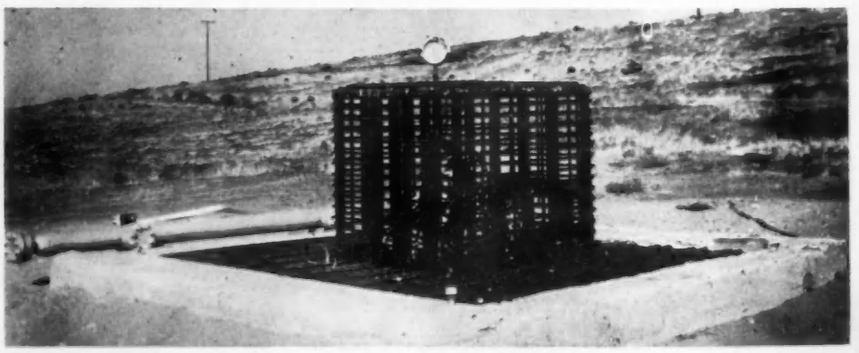
By bringing top sheet down across the top of the ends, bracing is obtained against sidesway.

2. PROTECTION

Anti-Sabotage Cage Guards Flow Units

TO PREVENT damage to Christmas trees and other surface equipment on flowing wells, a substantial steel cage is employed by one California company. The cellar of the well is a concrete monolith normally having a recess around the inner edge to receive a grated or plank cover. This is replaced with a latticed top which is made integral with the Christmas tree case by using sucker rods and flat steel securely welded to present a complete cover which must be removed with a truck boom and winch.

The cage is large enough to contain the control valves and flow beans leaving the pressure gauge above attached to a conventional pipe nipple. This cage not only protects the well equipment from damage by people with ulterior motives, but prevents cattle from rubbing against the valve wheels and flow bean adjustment.



All-welded cage of scrap rod and other lease steel forms complete coverage for all valves and fittings of the Christmas tree assembly and prevents unauthorized tampering and theft.

3. RIGGING-UP

Extensible Supports Aid Scaffolding

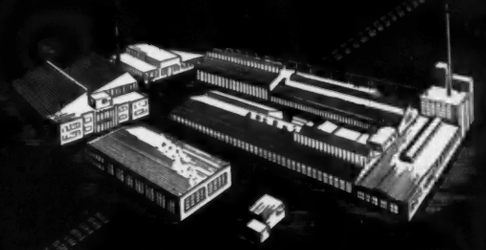
PROVISION of adjustable support for scaffolding, so as to accomodate material of varying width, is obtained by making the horses used as bases so they may be closed compactly for a two-plank stand, or opened out to provide for men and material.

The supports consist essentially of two parts, each composed of a pair of heavy pipe legs, welded to the end of a horizontal section of heavy pipe. By making these horizontal portions of pipe of different and telescoping diameters one is permited to slide within the other, it being necessary only to lift one end of the unit slightly and to slide it out to the required width.

By welding loops of heavy iron at the ends of the pipe sections, lifting and adjusting the unit to the desired width is simplified and the operator's hands

One purpose . . .

the IMPROVEMENT of Metals



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Further improvement in the construction and operation of all types of drilling and producing equipment used by the petroleum industry will be achieved only by detecting and utilizing available ideas and experience, for designing and producing metal parts, which provide the greatest factor of safety. It is not always the metals of which forgings are forged, but the ideas and experience, which come into action in forming forgings, that assure and sustain dependable performance. Manufacturers of oil well drilling equipment should find it profitable to utilize the ideas and experience, which our forging engineers have gained, for THE IMPROVEMENT OF METALS BY FORGING.

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The size with 3" bottom connection will allow tools 1¾" OD to pass through it.

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With the horizontal members formed from telescoping sizes of heavy pipe, these horses may be regulated in width to accommodate wide platforms, yet are not barred from close sites.

safeguarded against injury or possible pinching through contact of the inner pipe with the outside support at the point of lifting.

If security against possible spreading of the footing be required, it is easy to drill or burn matching holes through both pipes so that a pin or bolt may be inserted when the desired spread has been obtained.

4. METER SETTINGS

Removable Panel Cuts Service Time

METERS which are installed in more or less permanent positions, but which may be moved at any time, and which also are subject to periodic transfer to a central servicing station, can be mounted in a panel similar to that used in a compressor or pipe-line station.

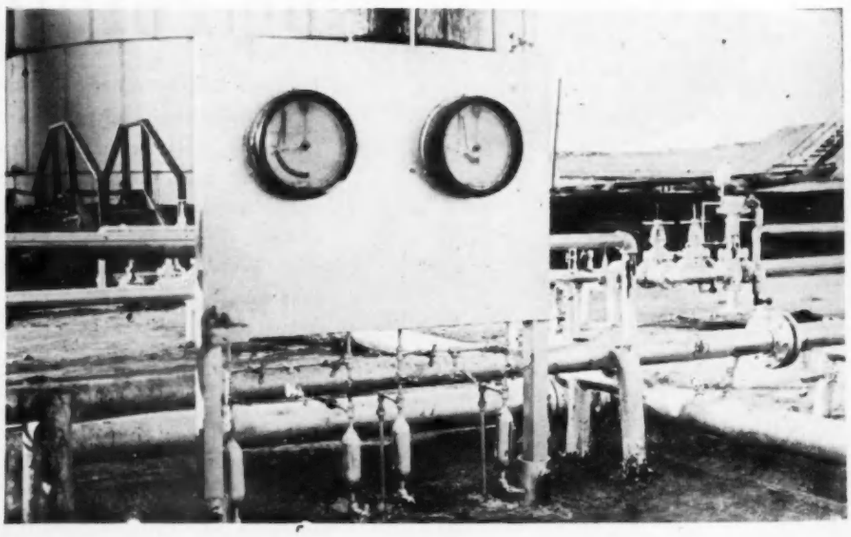
Meters so mounted are thoroughly supported and protected against vibration or possible damage through impact of crew members.

The panel is built to be self-supporting on angle-iron legs at the outer corners, and with rigid mounting for the recording equipment, with the usual piping at the back of the board. The instruments themselves are supported from the rims, instead of being carried on the pipe line and subject to expansion variations or vibration.

The mounting consists of two pipes of proper size to accomodate the angle-iron supports, the pipes being set in concrete for rigidity. The angle-iron legs are attached within the pipe with one or more bolts through pipe wall and adjacent flange of the angle, either of the bolt holes being slotted to provide vertical adjustment and levelling of the board if necessary.

To service, the entire panel board is removed by withdrawing the bolts, breaking the ¼-inch pressure lines, and handling the panel as a unit to the shop.

With such unitized set-ups, one spare may be rotated around any number of leases to afford required servicing of installations.



Flush mounting of these instruments on a panel affords maximum protection to units and connections, while tie-in to bases permits the quick removal of entire setting for servicing.

☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

A NUMBER of major oil questions—foreign operations, Elk Hills, the California off-shore lands and domestic supply—came to the fore in Washington last week.

Of most immediate interest to the industry was the discussion of Petroleum Reserves Corporation which featured the December meeting of the Petroleum Industry War Council, in which Administrator Ickes, who had disclosed details of PRC policies and program in an article in a national magazine, gave a lengthy explanation of the organization's objectives and plans.

Elk Hills came up with the disclosure that the Department of Justice had ruled against a new proposed contract between the Navy and Standard Oil Company of California, for unit operation, and the institution of an inquiry by the House Naval Affairs Committee to determine whether legislation should be enacted legalizing the proposed agreement or condemnation proceedings instituted.

The supreme court has been asked to determine the ownership of the California off-shore oil lands, on a petition filed by an unsuccessful applicant for an Interior Department lease who contends that title to the lands is vested in the federal government and not, as held by the General Land Office, in the state.

Ickes Quizzed by PIWC Concerning Government's Plans for Foreign Activity

»

House Committee Hearings Get Data on Earnings

»

Elk Hills Development Agreement Not Satisfactory to Biddle

»

By B. F. LINZ
Washington Correspondent

☆ ☆ ☆ ☆

The domestic supply situation was discussed at a hearing of the House oil committee, when IPA President Zook warned against dividing out total reserves by present annual demand to determine how many years' "supply" we have underground.

House Committee Told Current Good Earnings Come from Oil's Liquidation

A 20,000,000,000-barrel reserve and an annual demand of 1,500,000,000 barrels does not mean either that our oil resources will be exhausted in 14 years or that domestic production can meet demand for that period, the House oil committee was told December 6 by Ralph T. Zook, president of the Independent Petroleum Association.

Zook attacked the feeling of "complacency and confidence" which he said is created by statements attempting to relate production to reserve, declaring that today production in some areas is "well beyond the rate dictated by sound engineering and conservation practice" and that the present production rate is being maintained only at the expense of ultimate recovery.

He also challenged statements that our deficit, which will reach 500,000 barrels daily by the end of next year, can be met by imports, pointing out that foreign oil involves the use of tankers, which may be needed for the war in the Pacific.

"It is most important that the Congress and the citizens of the United States realize the situation which confronts them, the risks that are being taken and that they are staking their very existence and right to continue as a great nation, on imports of foreign oil," he declared. "In all fairness, they must be told that if there is failure the responsibility rests with those who have consistently and persistently refused to grant the necessary compensation in the form of a proper price for crude oil, so as to prevent the continued abandonment of the stripper wells of small production, the carrying on of secondary-recovery methods, and for a greatly enlarged wildcatting program to find new virgin oil pools."

Liquidation of Reserves

Zook devoted himself especially to the contention that there is no need for a price increase because of the satisfactory earnings of oil companies whose financial statements are published, and submitted the explanations of officials of several companies whom he had queried, showing that in many instances present apparently improved earnings are actually the result of liquidation of reserves which cannot be replaced at anything like present prices.

His own company, he said, is showing more book profit "and yet at the same time it is going out of business, and has refused to undertake projects which, at a proper price, would add to the available supply of oil.

"So as to make the record perfectly clear and plain," he added, "no one can say how much the crude-oil production of the United States would be increased by any specific increase in the price of crude oil, but it can be stated that unless this increase is allowed it is unlikely that there will be an increase in production, and it is probable there will be a decrease in the availability of crude oil and petroleum products for all purposes."

"The long delays in the office of Price Administration and Economic Stabilization culminating in the decision of Stabilizer Vinson to deny a general price increase," he concluded, "have permitted conditions to become progressively worse and these governmental agencies must assume the chief responsibility for the shortage in petroleum supplies and the consequent aggravation of rationing of gasoline and fuel oil."

Governors Favor Increase

The governors of many states are concerned over the situation, and of 25 or 27 queried as to their attitude on a price increase only one opposed it on the ground that it would add to the cost of living, it was declared by Governor John J. Dempsey of New Mexico.

"The reaction we obtained showed it was not a question of the producing states being more interested than the non-producing states but that all states are suffering alike from the shortage of oil and gasoline," Dempsey said.

"The price of crude oil in my judgment, and I have drilled some 150 wells, is no incentive today for wildcatting.

"The present situation is going to make it necessary for additional amounts of gasoline and oil to be provided for the armed forces. There is no place to get additional gasoline today other than to take it from civilian use. If we decrease further the volume of gasoline, you not only will affect the economy of the states but I think you are going to detrimentally affect the war effort."

There is no official in Washington having to do with oil who does not recognize the need for some relief and the encouragement of additional drilling, he told the committee, but there is disagreement as to how the relief should be afforded, he told the committee. Outside of PAW, he said, there are no experienced oil men in the agencies dealing with the problem.

Dempsey warned that it is too late for a 35-cent increase to attain the desired objective, and at least 50 cents a barrel will be necessary now.

And, he added, "I am firmly convinced that we are not going to get any relief except by action of Congress."

He agreed that Vinson's refusal of a price increase will save the public $500,000,000, but, he qualified it, "unless the price of shoe leather goes up, because they won't be riding."

Questioned by members of the com-

mittee how a price increase could be granted without providing a windfall for the major companies, Dempsey asserted that the present tax laws will recapture all but a small percentage of the excess income. Like all other witnesses who have testified, he held that a subsidy would be impossible of administration.

There is need for this country to adopt a domestic as well as a foreign oil policy, it was declared by J. C. Hunter, president of the Mid-Continent Oil and Gas Association, vice chairman of the Interstate Oil Compact Commission and member of PIWC.

"It is of utmost concern to the nation as a whole, as well as to the oil producing states and the petroleum industry, that there be maintined in this country a policy and program of oil production which will result in the discovery, development and utilization of our total petroleum resources to the greatest extent practically possible with the least amount of waste," Hunter said.

Strain on Capacity

"Notable progress in this connection has been made in recent years, but it cannot be overlooked that damage to this program is occurring, both through strain being placed on the oil productive capacity of the country as a direct result of the emergency demands of war and by the restrictive influence of rigid price ceiling levels entirely too low to permit either sufficient exploratory effort for new rsserves or the proper conservation of existing reserves through encouragement of secondary-recovery operations and prevention of premature abandonment of small stripper wells.

"This country has for many years been in a position, not only to supply domestic demand for oil and its products, but has been a net exporter of these commodities. The present situation clearly indicates a reversal of this position. The demands of war and peace in relation to our new discoveries of oil will, of course, largely determine the extent and nature of this problem. Looking to the solution of this present and increasingly apparent difficulty there must be adopted a comprehensive foreign oil policy which will provide for development and utilization of foreign oil by nationals of this country on an equal basis with nationals of other countries, and the foreign policy must operate in such a manner as to safeguard our domestic oil operations and insure the freedom of private enterprise, both in domestic and foreign operations.

"Obviously, this committee, as well as all concerned, are confronted with the growing need for a sound foreign oil policy, and likewise for an adequate and appropriate domestic oil policy, and that these two policies be so established, coordinated and maintained as to insure the optimum recovery and use of available petroleum and its products through the medium of private enterprise and without prejudice to our domestic oil supply and operations."

Finding Costs Increased

The cost of finding, developing and producing a barrel of oil today is $1.36, an increase of 59.4 cents since prices were frozen, it was declared by Merle Becker, executive vice president of W. C. McBride Company, St. Louis, and chairman of the subcommittee on cost of production of crude petroleum of the committee on crude oil requirements representing 37 oil associations which cooperated with the committee on cost and price adjustment of the PIWC in an analysis of the Tariff Commission report and subsequent price studies.

Becker explained that the figures were based on a study made in September, which showed that cost as of June 30, last, was $1.244 per barrel, brought up to date as accurately as possible on the basis of available data. The cost figures, he pointed out, are exclusive of interest for capital.

A break-down of the figures used to determine cost was submitted by the witness, as follows:

Finding Costs	$ .578
Development Costs	.320
Production Costs	.388
	$1.286
Less—Gas and Miscellaneous Revenue	.042
Estimated June 30, 1943, Cost	$1.244
Estimated additional Costs caused by increased hours at overtime rate	.050
Estimated additional Costs caused by increased drilling contracts	.066
Cost at Present time	$1.360

Becker emphasized that his committee believes that the margin above cost should be of such magnitude to provide funds for exploration, to cover replacement cost, a reserve for secondary-recovery or other conservation measures, a fair return on borrowed and invested capital, taking into consideration the hazards involved in searching for and finding oil, and adequate to maintain the industry as a healthy, going concern.

Investigators Find Oil Industry "Law" Abiding

Compliance activities of PAW were checked into December 8 and 9 by the Smith (House) committee investigating federal agencies, which found that the Oil Administration has had only four instances of violations of orders which required official action in 2½ years of operation.

The legal basis for suspension orders issued by the agency was explained by John Lord O'Brian, general counsel of WPB, and the orders themselves by J. Howard Marshall, chief counsel for PAW.

Marshall testified that three of the suspension orders, applying to Standard Oil Company of California, the Bel Air Oil Company of California, and a drilling contractor in the Tinsley field involved violations of M-68, while the fourth order, on a filling station operator, was for defiance of the station-hours order.

Under questioning by Chairman Howard W. Smith of Virginia, Marshall admitted that the M-68 order cut across state laws, where the latter were in conflict, but pointed out that it was impossible to enforce general conservation orders or other requirements of the war effort without so doing. He denied, however, that the order operated adversely to operators in states where closer than 40-acre drilling was permitted, explaining that, where possible, consolidations of small leases were secured and where that could not be done, exceptions were granted.

Ickes Spends Two Hours Discussing Foreign Policy with Industry Council

Policies and activities of the Petroleum Reserves Corporation, as outlined for the first time in a national magazine story by PRC President Harold L. Ickes was a major subject of discussion at the December meeting of the Petroleum Industry War Council.

Ickes, himself, made what was probably his longest appearance before the council, first explaining PRC and later answering questions regarding the organization, but even after his two-hour discussion the matter remainded before the meeting for a considerable period. The discussion was variously described as "entirely friendly" and as anything but.

So far as could be learned, Ickes told the council that PRC is not actively operating, and many members received the impression that it is marking time until President Roosevelt returns to Washington. On its part, the industry indicated clearly that it felt it should have a hand in the formulation and prosecution of any foreign oil policy.

The question of PRC was brought up even before the general session, when J. M. Lovejoy broached it at the monthly meeting of the committee on production, expressing the view that the industry, and particularly the producing branch, should have more specific information on the principles and policies of the organization, a matter he pointed out, of primary importance to every oil operator in the country.

No Report on Economics

For the first time in its history, the council failed to receive a report from its committee on petroleum economics. A report was prepared, but is understood to have got into difficulties over military information, with the result that it was suppressed, and only a brief verbal report was presented by Chairman Robert E. Wilson.

The price situation also was a major subject of consideration, with Price Administrator Chester Bowles and Col. Bryan Houston, deputy administrator in charge of rationing, appearing before the council at one of its sessions. This matter also had received attention at the production committee meeting, when PAW Production Director Don R. Knowlton reported that he was making a detailed study of all subsidy proposals that have been advanced to determine whether any such plan would be workable and administratively feasible.

The study is being made at Ickes request, in consequence of the suggestion of Stabilization Director Fred M. Vinson that an alternative for a crude price increase be developed to give relief to those segments of the industry needing it.

The post-war situation of the oil in-

dustry was also brought up for discussion, as was the crude shortage in District 2. On the latter matter a resolution was adopted strongly opposing a plan of Defense Supplies Corporation to provide compensation for excess transportation on West Texas crude brought into the district by rail, but only for companies not in excess-profits brackets.

The resolution set forth the council's belief that such discrimination between companies will (a) fail to accomplish the desired results of getting large volumes of crude transported, since no company will be able to tell, until near the end of each year, if then, whether or not it will be in the excess-profits brackets, and (b) in effect requires some companies to subsidize the government while its competitors are being subsidized by the government for identical actions.

"If the compensation plan was extended to all, around 90 percent of such compensation would revert to the government if the company should eventually find itself in excess-profits brackets," it was pointed out.

"This council protests against the adoption of a plan which will be both ineffective in meeting an emergency situation, and inequitable in its discriminatory treatment of competing members of an industry, and urges further efforts by the petroleum administrator to secure a more equitable and effective compensation plan."

Steel

Allotments of steel for first quarter 1944 production operations are 255,000 tons of carbon steel and 52,000 tons of alloy steel, plus an additional 16,800 tons of steel for maintenance, repair and operating purposes. Knowlton disclosed in his report to the production committee.

These quantities, he said, should be sufficient to conduct the 5400-well drilling program forecast for the first three months of next year, but will not be adequate unless operators apply for only the quantity of material they actually need and exercise diligence to reduce their requirements of alloy steel N-80 pipe to the greatest extent possible.

"It is fully expected that sufficient materials will be made available for drilling 24,000 wells during 1944, but not that there will be a surplus over and above the amounts required," he commented.

Reports on the amount of steel needed to drill for and produce one barrel of sustained production per day for one-year and five-year periods in fields not completely developed have been completed for District 4, Western Kansas and most areas in District 3 with the exception of piercement-type salt-dome fields, Knowlton reported. Western Kansas wells will need on the average 1.3 tons per barrel and District 4 wells 1.1 tons per barrel for the first year; advance data with respect to Texas wells indicate that average factors there will be higher on account of the restricted current outlet for the West Texas area.

Knowlton referred to the fact that PAW production rate certifications now are criticised as being too high, whereas originally they were held to be too low, and disclosed that PAW is concerned over the difficulty of getting the states to schedule their quotas so as to reach the PAW figure.

"These production rates certified each month have more significance than is generally attributed to them," he explained. "The anticipated production fits into a world-wide petroleum supply program to serve the Allied Nations. If any state fails to produce the certified rate, our program cannot be met. For this reason I am anxious that state allowables be set to meet the certified rate."

Controlled Materials

A report by Director of Materials Frank A. Watts disclosed that second quarter 1944 PAW-35 applications for controlled materials for production operations will be processed, commencing December 16, in the district offices in the order they are received, and he appealed for the cooperation of all operators in filing applications for no more material than will be required for second-quarter use as a means of keeping the supply of oil-country tubular goods in balance with the demand.

Based on these premises, he said, it is now planned that applications of those operators who will require less than 500 tons of carbon steel or less than 300 tons of alloy steel be processed on the basis of 100 percent of the amounts for which applications are filed for materials required for authorized operations. Applications of all operators requiring greater amounts will be processed on the basis of whichever amount is greater—that allotted to the operator for the fourth quarter, 1943, or that for the first quarter, 1944.

Watts revealed that the forward planning and advance placing of purchase orders for the delivery of tubular goods, coupled with the results of converting paper allotments into tubular goods, have resulted in little demand for the field stocks established several months ago to make material readily available for wildcat operations and certain emergency uses.

The number of rotary rigs now in operation is close to 1350 as compared with 1280 reported at the Chicago meeting last month, and with 713 at the beginning of the year, Watts reported.

PAW shortly will issue an amendment to P-98-b, eliminating the requirement of assigning preference ratings for the purchase of rock bits and core bits, which will eliminate considerable paper work and avoid a great deal of unnecessary confusion, the committee was informed.

Discussing the current situation, Watts said that new internal combustion engines and repair parts for old engines continue as bottleneck items, military demands having increased rather than decreased.

One of the serious problems next year, he said, will be the need for new trucks and repair parts for existing equipment which will exceed the supply. A truck production program has been authorized for next year, but before the vehicles begin to reach the market the civilian stockpiles of new trucks established during 1941 will be practically wiped out.

Discussion of this matter brought the complaint that the agencies dealing with the situation apparently are more concerned with general transportation requirements, such as buses, etc., than with individual industry requirements, and Watts explained that while PAW is receiving cooperation from ODT and no case has been reported whether operators had not been able to get needed equipment, it was doubtful whether PAW would receive any more authority than it now has.

Manpower

A report by R. V. Shirk of the production division on manpower problems disclosed that PAW has had no success in its efforts to have the War Manpower Commission list derrickmen, enginemen, floormen and pumpers placed on the critical list but has succeeded in having derrickmen placed on the list of essential operations and is now attempting to have similar treatment accorded enginemen and pumpers, but has been advised floormen will not be so listed. Currently an effort is being made to secure recognition for oil well shooters.

Dr. F. H. Harbison, labor counselor, reported that WMC and its regional offices have now been convinced of the industry's manpower needs and are willing to help, and the industry has in effect "a hunting license" to procure its requirements as and when needed.

WMC, Dr. Harbison said, now is receptive to a program of active recruiting of oil workers by the industry, which he urged operators to capitalize on.

Elk Hills Reserve Development Contract Again Rejected by Department of Justice

New efforts of the Navy Department to reach an acceptable agreement with Standard Oil Company of California for operation of the Elk Hills Naval Reserve ran into difficulties last month when Attorney General Francis Biddle rendered an opinion that a proposed agreement for unit operation could not be entered into without new legislation, it was disclosed last week by the Attorney General during a hearing before the House Naval Affairs Committee.

As a result, the committee has instituted an investigation to determine whether legislation should be enacted or the alternative, condemnation of the company's lands, be ordered, and will hold hearings on the matter next month.

In the meantime, it was disclosed, the Navy and the company have agreed to a 90-day extension of the temporary operating agreement entered into September 8, under which a limited quantity of the company's oil is being withdrawn, eventually to account to the Navy for the government's share of the oil produced from the reserve since November 20, 1942, with the company's expenditure in drilling wells on the Navy's lands to be repaid by the government only if an appropriation for that purpose is approved by Congress.

Biddle explained that the proposed

new contract eliminates a number of objectionable features in the original contract, but leaves some questions for study.

The proposed agreement provides for the development and operation of the reserve as a unit, making all wells, equipment and facilities on the lands of either Navy or Standard Oil Company of California available for use by the Navy or by the operator selected by it. The interests of the two parties in the oil and gas are defined by percentages, initially determined to be: Navy 64 percent, company 36 percent in the shallow oil zone; Navy 77 percent, company 35 percent in the Stevens (deep) zone.

Production from the reserve would be allocated, permitting the company to receive from the shallow zone 15,000 barrels of oil daily, on a quarterly average, during a primary period which would be the shortest of (a) until six months after cessation of hostilities, (b) until the company shall have received 25,000,000 barrels of oil from shallow-zone production, or (c) until the company shall have received from shallow-zone production one third of its share of the estimated recoverable oil in that zone. Navy has the privilege during the primary period of causing production to be increased, for itself, until the amount received by it equals its share under the percentage participation, production thereafter being allocated currently between Navy and company in accordance with their percentages, saving to the company the right to its guaranteed production during the primary period.

After the primary period, Navy could suspend production from the entire reserve, subject to the right of the company to receive daily sufficient oil to cover its current costs of operation, current taxes on land, equipment and interests under the contract. In no event may the company, without Navy approval, receive production from any zone after its withdrawals therefrom have equaled one third of its share of the estimated recoverable oil in that zone. Navy, however, may permit production from the reserve after the primary period in excess of that to be taken by the company to meet costs and taxes, but the company may receive only one third of what its percentage participation would have been if the amounts received by Navy and the company were in balance with their percentages, Navy to receive the remainder of the production until it has brought its share into balance with its percentages.

Neither party would have an exclusive or preferential right to purchase the share of oil produced by the other, and Navy could employ the company or any other operator to carry out the contract, but if the company is selected its compensation is limited to cost to itself.

Costs are to be borne ultimately by both parties in accordance with their relative percentage participations in production, but current costs are to be met by each party in proportion to its current production. Special provisions are made for drilling costs, however, where exploratory drilling is approved by an engineering committee equally representative of both parties, which would be set up, the cost is to be divided between Navy and company in proportion to their interests; where not so approved, but ordered by Navy, the government would bear the entire cost, and only if the company determined to utilize an exploratory well in the shallow zone for productive purposes would the Navy be relieved of the necessity of paying therefor.

The contract would remain in effect so long as production continued in paying quantity, with no provision for earlier termination.

In an opinion sent to Secretary of the Navy Knox on November 24, Biddle expressed doubt whether the contract was authorized by statute, and held it should not be signed on behalf of the government "without more specific approval by Congress than is found under present statutes."

Biddle told the House committee that one question in his mind relates to the inclusion of the entire reserve under the unit plan, rather than only that portion which is checkerboarded and thus subject to drainage. "If this is a conservation contract," he commented, "we must be sure that the inclusion of all of the Navy's 35,000 acres as well as Standard's 8000 acres is appropriate to protect the Navy's underground oil."

Other questions, he said, related to the necessity from the outset of revision of the limiting lines of the productive areas; whether more responsible authority should be given the Navy, particularly with reference to such basic matters as revisions of the percentage participations and authority to drill new wells; and the desirability of a more definite specification for ending the primary period of operations.

"Finally," he said, "the absence of a termination clause ought to be considered. The contract has not time limitation and is operative as long as any oil is left in the reserve. If the contract were executed and it was subsequently determined to condemn, the United States could without doubt condemn the company's interest in the contract. Such a course, however, might involve more substantial damages than if the land were actually condemned; and in any event the execution of the contract for an indefinite time involves the United States in a policy of joint operation which would make it, morally at least, difficult for the government to change at a subsequent time.

"I suggest, therefore, that the contract should not be approved unless it contains a cancellation clause, such a clause to provide a reasonable time in which either party could give notice of termination, and appropriate provisions for an accounting of all operations under the contract.

"Moreover, the contract with such a cancellation clause would be the expression of a temporary policy; that is, that the United States enter into a unit plan of operation calculated to conserve oil, at a time when the actual value of the oil in the ground had not been ascertained. Operation under the contract would undoubtedly give the government far more accurate knowledge ascertained over a given period of time, the government would be in a much better position to determine whether an ultimate condemnation would best serve the national interests."

The committee, he said, must make a choice between condemnation and a unit operating agreement, both alternatives involving some uncertainty.

The Attorney General summed up the situation as follows: "Condemnation would give us definite ownership and control over all the oil in the reserve, at a cost which is necessarily uncertain until resolved by the verdict of a jury. The unit plan agreement would give us substantial control over the oil in the reserve after a maximum of 25,000,000 barrels had been taken by Standard out of its share, the shares of ownership, however, necessarily remaining uncertain during the life of the reserve except as they are resolved by the engineers' committee (and in case of disagreement, by the Secretary of the Navy."

Biddle pointed out that had condemnation been resorted to when the original agreement was rescinded last September, all the wells on the reserve would have had to shut down, including those on the portion now belonging to the company, because there is no authority under existing law to produce oil from government land in the reserve for the sole purpose of using the oil, but only as an incident to protecting the government's supply under ground.

The proposed agreement was defended by the Navy in a statement expressing belief that it eliminated features of the original contract which had been subjected to criticism and conserves the government's interests.

"In contrast with condemnation, the objectives are achieved without cost to the government at present and unless expenditures are hereafter authorized by Congress," it was stated.

The proposed contract was attacked in Congress by Representative Jamie L. Whitten of Mississippi, who urged that Standard holdings be condemned and legislation enacted authorizing operation of the field by the government. Such legislation, he said, could probably be put through quicker and with less difficulty than a bill authorizing the contract.

Whitten asserted that there are numerous flaws in the proposed agreement, asking the House how it could be determined that the Navy was entitled to 64 percent of the oil in the face of Secretary Knox's statement that the lands should not be condemned because it was not known how much oil is under the company's part of the reserve.

The congressman urged that no time be lost in consolidating the government's ownership of the field, and suggested that future condemnation of the field, if the contract was approved, might be even more difficult than it would be now.

"I have never known of the federal government to be so hesitant to take over property for public use," he commented.

"They have not hesitated to take over farm lands for government projects in many cases of doubtful public benefit. They have not hesitated to take over an entire town in my district.

"Yet in this case, where the future operation of our fleet, the very safety of our government and people are involved, we find the Navy Department hesitant to act after having already delayed action since 1938."

Congressman Attacks PAW Supply Rules

A determined drive for revocation of PAW Directive 59 and PAO 5, charged by small distributors as being the machinery by which a few large companies can develop a monopoly on the East Coast, brought the matter of control of primary suppliers into the open at hearings before a Senate subcommittee and introduction by Representative L. Mendel Rivers of South Carolina of a bill rescinding them by congressional mandate.

Directive 59, issued September 26, 1943, provides for the channeling of supplies for the East Coast in such a way as equitably to meet demand in the several zones ,and called for the pooling of facilities. PAO 5 picks up the control of distribution where the directive leaves off.

California Offshore Land Question Before High Court

The years-old controversy over title to the California off-shore lands was revived last week, when the United States Supreme Court was asked to determine ownership through review of a decision of the District of Columbia Federal Court holding that Robert E. Lee Jordan had acquired no interest or legal right in leases which he sought from the General Land Office.

The suit originated as the result of the filing of two applications by Jordan with the General Land Office on April 6, 1937, for prospecting leases on the off-shore lands. The applications were rejected on the ground that the submerged lands belong to California and the Interior Department had no jurisdiction to grant the leases. Jordan appealed to the Secretary of the Interior on August 6, 1937, and alleged that no action was taken up to June 16, 1942, when suit was filed in the district court seeking a declaratory judgment that title to the lands was in the United States.

Important to Decide

"It is important to the United States government that the question of title and ownership of the submerged lands off the west coast of California, within the three mile limit, be decided in order that it be determined if they are a part of the public domain and subject to be leased by citizens of the United States who qualify under the terms of the Oil Land Leasing Act of 1920, as amended in 1935," the court was told in Jordan's petition.

"It is in the interests of the United States government that the ownership of minerals, including oil and gas, which are or may be found in the submerged lands off the west coast of California within the three mile limit be determined, and if they are, according to the general policy of the United States government with respect to minerals, owned and reserved to the United States government."

It is also of vital interest to the government that the authority of the Secretary of the Interior to hold up appeals for six years, allegedly vitiating the purpose of the leasing act, be determined, it was declared.

"It is in the interests of the United States and the general public that all obstructions to the leasing of oil land, the production and development of new sources of supply, should be removed, including that of the Secretary of the Interior," it was argued.

"It is exceedingly important that the authority of the Department of the Interior under the act and its amendments be so defined that there may never be a reoccurrence of a situation such as in the instant case.

"It is important that the dicta decisions of the courts, regarding the ownership of and title to the submerged lands and the extent of the public domain, included in the territory ceded by Mexico to the United States, be reviewed and grants made by Congress with reference to the public domain."

The brief pointed out that this is the first time the question of the ownership of and title to the California off-shore lands has been presented to the court, and raised the issue whether the Secretary of the Interior has the authority to determine that the title was in California, as allegedly held by the General Land Office.

Rail Freight Adjustments On Discrimination Basis

Decision of Defense Supplies Corporation to pay transportation compensation on rail shipments of oil to the Middle West only to companies not in the excess-profits brackets has created a problem on which industry leaders are working.

The announcement of the decision said that the difference between pipeline and rail costs would be compensated beginning December 4, and was immediately attacked as discriminatory and likely to handicap the whole effort to move West Texas oil to District 2 refineries.

In some quarters it was charged that the arrangement, announced by Secretary of Commerce Jesse H. Jones, was an overt indication of the Administration's preoccupation with its campaign against "big business", and part and parcel of the philosophy which has stymied efforts to secure an increase in crude prices because the benefits would accrue equally to the integrated companies and independent producers.

It was pointed out that even if some of the benefits of the compensation or price increase went to companies in the excess-profits brackets, the government would recapture all but a fraction through the excess profits taxes.

Tank Cars Shifted From East to West

ODT orders freezing tank cars in the Eastern petroleum movement last December 29 were partially relaxed December 9 to permit shippers of crude and products to remove cars from East Coast service to haul shipments to the West Coast.

The relaxation was explained by A. V. Bourque, associate director of the ODT division of petroleum and other liquid transport, as necessitated by the growth of the essential movement to the West Coast, which now requires quick provision of tank cars to meet emergency demands. In view of the fact that many shippers are shipping to both the East and West Coasts, it was deemed advisable to amend the freeze order so as to permit uninterrupted movement to either coast without the delay necessary to secure a permit from the section of tank car service.

The amendment provides that tank cars frozen in the East Coast petroleum service may be shifted to the movement of petroleum products from points of origin east of Montana, Wyoming, Colorado and New Mexico to points in California, Oregon, or Washington. Shippers are required to notify the ODT within 24 hours after a withdrawal is made, and it is also stipulated that all such cars shall be returned to the Eastern service when no longer needed in the West.

37 Tankers Added To Fleet in November

Thirty-seven tankers, 4 concrete barges and 2 tank carriers were among the 164 vessels delivered by shipbuilding yards in November, it was disclosed by the monthly report of the Maritime Commission.

Tankers delivered included 3 from Alabama Dry Dock and Shipbuilding Company, Mobile; 1 by Barnes-Duluth Shipbuilding Company, Duluth, Minnesota; 3 by Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Maryland; 11 by California Shipbuilding Corporation, Wilmington, California; 6 by Delta Shipbuilding Company, New Orleans; 5 by Kaiser Company, Portland, Oregon; 1 by Marin Ship Corporation, Sausalito, California; 6 by Sun Shipbuilding & Dry Dock Company, Chester, Pennsylvania, and 1 by Welding Shipyards, Norfolk, Virginia.

One of the concrete barges was delivered by Barrett and Hilp, San Francisco; two by Concrete Ship Constructors, National City, California; and the fourth by the San Jacinto Shipbuilders, Inc., Houston.

The two tank carriers were built by the J. A. Jones Construction Company, Panama City, Florida.

Thompson and Vinson Talk Crude Price Situation

There was considerable speculation in Washington this week on results of the conference between E. O. Thompson, member of the Texas Railroad Commission, and Economic Stabilization Director Fred M. Vinson. After the meeting with Vinson, which was for the stated purpose of discussing crude oil prices, Thompson went to the Capital for a talk with Speaker Rayburn. J. S. Abercrombie of Houston accompanied Thompson at both conferences.

Both Thompson and Abercrombie said they had talked with Vinson about his refusal to override the Office of Price Administration in rejecting a 35-cent-per-barrel increase in crude prices recommended by PAW Ickes. No details of the conversations were given out, but the question arose whether or not there might be some action forthcoming to forestall a House showdown on the price issue.

Cooperative Efforts in Fields Studied By Interstate Compact Commission

The Interstate Oil Compact Commission met in Wichita, Kansas, last week for the last quarterly meeting of the year. Most of the session was devoted to a study of cooperative efforts in the control of oil fields. Most of the eleven states which are members had representatives at the meeting, and there were oil operators from Texas, Kansas, Louisiana, New Mexico and Oklahoma. Representatives of PAW, the Bureau of Mines and the Federal Power Commission were there also.

Representative Hatton W. Sumners, Texas congressman, addressed the session briefly, and urged that more problems common to the various states be handled through compacts. He said that the compact plan is efficient and the only means by which the states will be able to retain power over problems too big for one state to handle alone.

"Anyone with any sense realizes the dangers of power in the federal government," Sumners said. "One reason why the states have lost power is that they have not properly exercised the powers which they had. Where power or strength is not used, nature takes it away.

"If there is a problem too big for one state to handle, then it must be turned over to the federal government for an effort must be made to cooperate with other states which have this same problem.

"Eventually, if we continue to turn things over to the federal government, the people and the states will no longer be able to do anything, and we will have dictatorship."

Field Engineering Committees

The benefits of voluntary cooperation through engineering committees in Texas oil fields was outlined by V. E. Cottingham, chairman of the North Basin Pools Engineering Committee.

There are only seven such committees of associations in Texas, but the fields in which they function contain 50 percent of the estimated reserve of the state. These committees, usually headed by an engineer responsible to and paid by the entire group, acquire, assemble and analyze information concerning the fields. This information is then disseminated among all the participating operators who pay for the service in proportion to the amount of oil each produces in the field.

In some fields the company engineers as a group gather and analyze the information and no outside engineer is employed. In other fields the operator's committee establishes a general operating policy and it is the function of the paid committee staff to put into effect these policies.

The Yates Pool Engineering Committee was the first organization of its kind in Texas and originated in 1928 as a means of effecting a voluntary proration program. Records of the water, gas and oil withdrawals have been carefully tabulated, and together with other information relating to production have formed the basis for an excellent unit operation of the pool, despite the fact that each operator has been in charge of his own properties.

Then came the Conroe Operators Association in 1932, the East Texas (field) Engineering Association in 1933, and subsequently the Judkins Pool Engineering Committee, the Goldsmith Pool Engineering Committee and the North Basin Pools Engineering Committee. The latter includes Seminole, Wasson, Waples-Platter, Ownby, Dean and Slaughter, in which fields there are 3218 wells.

Committee representatives supervise potential, bottom-hole pressure and gas-oil ratio tests. The cost to the North Basin Pools Committee for service during the past five years has been 2.3 mills per barrel of oil produced.

Cottingham recommended the program especially for larger fields where there are several interests involved. Duplication of engineering and statistical work is avoided and the cost spread among all the operators.

Cooperative Pressure Control

Cooperative reservoir control in the K-M-A field was discussed by Wm. H. Rouser, Jr., engineer of the pressure-maintenance association in the field. He declared that the results had been beneficial to the extent of 20,000,000 barrels more oil to date, despite the fact that the reservoir is not a regular homogeneous sand body. He believes that future benefits will assume an even larger proportion for cooperation in control has an additional value when production becomes more difficult.

The field includes about 30,000 acres in Archer and Wichita counties, Texas, and the deeper production was found in 1927 in the Strawn section at 3650 feet. There are 1611 wells producing from this horizon, located on 375 leases owned by 154 operators.

In 1939, gasoline-plant operators in the field sensed the value of the pressure-maintenance program, and the association formed. The field was divided into six units for purposes of study, which had as their basis a grouping of royalty interests so that waivers could be obtained to allow the return of gas to leases within a general area without a title charge for gas produced by one lease and returned to another. The expense of compressing the gas returned to a unit was distributed between the operators within the unit on the basis of the number of wells within the unit owned by each operator.

Over $3,500,000 is now invested in the gasoline plants and the gas return system. The 102 input wells in use represent the expenditure of $2,000,000 more.

The engineering committee and the executive committee meet when action is necessary. The engineers of the operators, meeting as an engineering committee, do not vote in that committee as representative of their managements, but rather as technicians considering the factors involved to arrive at a proper conclusion.

The amount of gas returned has increased from 129 feet per barrel of oil produced in 1940, to 507 feet per barrel of oil produced during the first 10 months of 1943. A total of 14 billion feet of gas had been returned up to November 1. The maximum returned in one well has been 300,000 feet per day, and the average has been some 100,000 feet per day. Only 80 percent of the wells in the field are incorporated in the program. However, it appears that those who have remained outside the program will be the losers, as calculations indicate that leases in the repressured area will recover five times as much oil as is recovered from the outside area.

"It is felt that the estimate of an increase in recovery of 30 to 40 percent, which was used to justify the installation of the project, will be fulfilled with considerable volume to spare," Rouser said.

He recommended the Interstate Oil Compact Commission educational program as a means of bringing the benefits of this method of operation to the attention of producers throughout the country. This will enable the regulatory bodies of all the oil states to sponsor and supervise such programs intelligently when they develop.

More than $2,500,000 and 6700 tons of steel is the initial saving effected by the first 37 dually-completed oil and gas wells in Arkansas, L. L. Jordan and Alec Crowell, engineers with the Arkansas Oil & Gas Commission, reported to the compact members. These dual completions, as of December 1, 1943, account for an average monthly production of 200 thousand barrels of high-gravity oil and condensate and 2 billion 100 million cubic feet of gas.

At a hearing May 27, 1942, the commission heard evidence to the effect that the average cost of the common deep well in Arkansas, the authors explained, was approximately $78,100. It was recorded that a single-zone completion to 8000 feet would cost $65,000 and one to 9000 feet would cost $76,700. Thus, by dual completion, a saving of $64,200 or 45 percent of the cost of the two wells could be realized.

The commission was advised at this hearing that the total steel necessary for completion of the deep wells was approximately 200 tons, while for a dual completion the figure was only 13 tons more.

Close checking of the result is attained by complete separation of flow from the two pays in each well. One is flowed through tubing and the other through the annual space between tubing and casing, and production is measured separately.

Of the 37 dual-completion wells now operating in the state 31 are in the Dorcheat - Macedonia field, Columbia County. This field already has a proved reserve of 90,000,000 barrels of oil and more than 400 billion cubic feet of gas. The field has 66 producing wells so far, 21 of which are unitized on an 1160-acre block. Two thirds of the field reserve is in Smackover Lime below 8600 feet (subsea). The remainder is in Cotton Valley sandstone below 6500 feet (subsea).

Oldest dual wells in the field remain trouble-free after more than a year of operation. Original packers are still tight.

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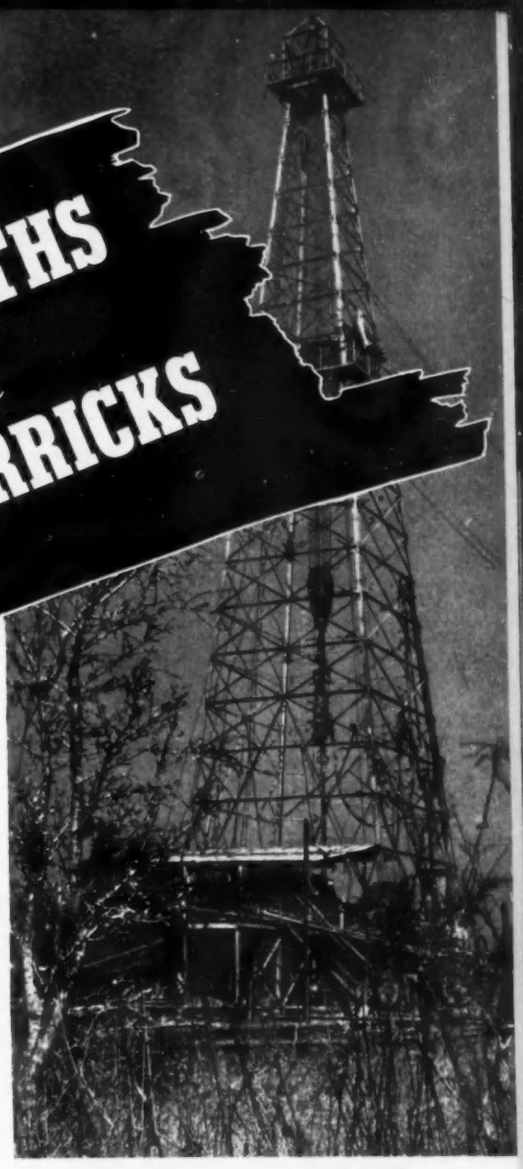

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November Completions Highest in 1943 But Total Far Under Last Year

The rate of completing wells during November reached the highest level of the year, and the second highest point since government restrictions reduced drilling operations from their pre-war level. An average of 422 completions were made weekly during November, in comparison with a weekly average of 386 in October, 385 in September and 398 in August. The completion of 422 tests per week practically levels the war-time peak of 423 finished weekly during September of 1942.

There are indications that the recent increase in drilling is to continue, the number of rigs in operation (including drilling and rigged up) on December 1 totaled 3261. This compares with 3168 on November 1, with 2986 on October 1, and 2868 on September 1.

There were 1688 completions, including dry holes, during the four weeks ended November 27, in contrast with 1931 completions during the five weeks ended October 30, 1943. The November rate was materially higher than the rate of completing wells a year ago, when 1755 tests were finished during the four weeks ended November 28, 1942, for a weekly average of only 351.

The higher rate of completing wells during recent months has made up much of the decline in drilling as compared with a year ago, but the total for the year is still 13.5 percent under 1942 at this period. There have been 17,211 tests completed in January through November of this year, in contrast with 19,895 during the same period of time a year ago.

The sharpest declines in completion rates among states during the 11 months has been in Louisiana, Pennsylvania and New Mexico. Louisiana completions at the end of November were 39.4 percent under a year ago; Pennsylvania was off 35.4 percent; New Mexico down 31.8; Indiana down 28.5; and Texas off 20.1 percent. Some states have completed more wells than in the first 11 months of 1942. Most notable increase has been the 79.2 percent gain in California, where completions this year have amounted to 1310 against 731 at this time last year. Kentucky also has shown a sharp increase, having 388 completions against 155 for a 150.3 percent gain. Wyoming completions are up 16.8 percent, Arkansas up 13.9 percent and Oklahoma ahead by 4.0 percent.

The 1688 tests completed in November resulted in a national total of 877 oil wells, 119 gas wells, 499 dry holes, 149 water input, gas injection and salt water disposal wells, and 44 old wells deepened. Thus, there were 219 oil wells completed per week during the four weeks ended November 27, as compard with 199 weekly average during October. On a weekly basis, November had 29.7 gas wells against 27.4 in October, and 124.7 dry holes compared with 125.2 in October. This constitutes an upward trend in producing wells completed, and a downward trend in dry holes.

Building Gasoline Plant In Panola County

Arkansas-Louisiana Gas Company is building a 25,000,000 cubic foot absorption type gasoline plant northeast of Carthage in Panola County, East Texas.

The company has several wells in the area and plans additional drilling. Work is starting on 10 miles of 16-inch gas line from Bethany to the new plant.

Wells Completed in United States Through November

(Figures compiled from weekly reports of editorial staff men, with following exceptions: Arkansas data from Arkansas Oil & Gas Commission; California from A.P.I. except for November; Illinois from Illinois Geological Survey except for November; Indiana from Indiana Division of Geology; Missouri from Missouri Geological Survey; Bradford, Allegany of New York [for November], and Kane-Clarendon, Pennsylvania, from *The Producer's Monthly*; Tennessee from Tennessee Division of Geology).

	MONTHLY COMPLETIONS: November 1943									CUMULATIVE COMPLETIONS: First 11 Months								RIGS IN OPERATION					
	Details for Nov., 1943					Total Completions				Details Jan.-Nov., 1943					Total Completions				Details for December 1, 1943			Total: Drilling and RU		
	New Wells				Old Wells					New Wells				Old Wells										
State or District	*Oil	Gas	Dry	Others[6]	Deepened	Nov., 1943[1]	Oct., 1943[3]	Nov., 1942[2]	Total Footage Nov., 1943	*Oil	Gas	Dry	Others[6]	Deepened	Jan.-Nov., 1943[4]	Jan.-Nov., 1942[5]	Percent Change	Total Footage 11 Months 1943	Drilling	Rigs Up	Shut Down	Dec. 1, 1943	Nov. 1, 1943	Dec. 1 1942
Alabama												2			2	3	— 33.3	11,127	1		1	1	1	2
Arizona			1			1			3,464			5			5	2	+150.0	14,498	1		3	1	3	
Arkansas	11		8			19	29	24	81,257	142	1	92	2	1	238	209	+ 13.9	1,125,140	36	8	10	44	43	17
California	105	1	15		2	123	133	89	423,368	1,020	26	231		33	1,310	731	+ 79.2	4,075,674	292	64	25	356	354	147
Colorado			1			1	1		3,584	10	2	11			23	14	+ 64.3	62,096	9	1	10	10	17	11
Florida	1					1		1	11,616	1		4			5	1	+400.0	22,833	4	1		5	1	1
Georgia												1			1	2	— 50.0	1,240			1			
Illinois	89	1	56	2	5	153	201	185	384,002	938	12	650	21	39	1,660	1,960	— 15.3	4,114,564	192	19	22	211	198	233
Indiana	10	1	15			26	26	28	46,896	88	8	150		5	251	351	— 28.5	458,458	36	5	12	41	49	77
Iowa																			1		1	1		
Kansas	81	2	76	1	3	163	196	138	546,322	796	27	732	19	24	1,598	1,490	+ 7.2	5,306,804	229	37	13	266	264	172
Kentucky	18		29			47	71	28	79,617	182	5	196	3	2	388	155	+150.3	737,279	64	4		68	72	48
Louisiana	31		12			43	44	75	352,152	291	35	196			522	861	— 39.4	2,918,238	97	6	15	103	112	96
North	9		1			10	11	43	34,885	89	26	87			202	403	— 49.9	34,885	29	4	12	33	35	23
South	22		11			33	33	32	317,267	202	9	109			320	458	— 30.1	2,883,353	68	2	3	70	77	73
Michigan	18	4	27		2	51	64	60	123,908	198	47	291		9	545	633	— 13.9	1,389,290	83	21	34	104	96	103
Mississippi	4		2			6	14	6	32,148	40		53			93	97	— 4.1	585,589	12	2	3	14	14	11
Missouri	1	3	1			5	1	1	2,769	2	5	20			27	34	— 20.6	21,769	5		1	5	3	2
Montana	16	1	13			30	14	12	66,916	122	36	50			208	186	+ 11.8	453,695	63	12	5	75	70	28
Nebraska																28			4			4	3	16
New Mexico	11		6		1	18	31	25	51,431	161	6	66		12	245	356	— 31.2	730,515	75	4	15	79	88	62
New York	68			36		104	131	125	138,183	722	4	6	409		1,141	1,137	+ .35	1,559,075	93	13	21	106	122	100
North Dakota																								
Ohio	13	9	4			26	50	123	64,345	135	312	247	1	12	707	1,036	— 31.8	1,777,730	172	24	43	196	191	202
Oklahoma	72	14	42	7	12	147	168	102	445,552	510	95	581	60	96	1,342	1,290	+ 4.0	4,129,641	336	51	1	387	338	201
Oregon																								1
Pennsylvania	103	30	10	100		243	218	286	425,360	933	213	60	1,027	11	2,344	3,627	— 35.4	4,029,178	224	31	52	255	280	327
South Dakota																			1		1	1	1	1
Tennessee											2	4			6	8	— 25.0	6,134	2		1	2	4	2
Texas	215	11	164	3	19	412	438	353	1,676,434	2,043	115	1,584	46	121	3,909	4,894	— 20.1	16,253,534	764	35	105	799	726	504
E. Tex. Border			2			2			14,180	13		5			18	12	+ 50.0	114,294	8	1		9	9	6
E. Tex. Field								1					5		5	17	— 70.6	11,950						
Rest of E. Tex.	20		11	1		32	26	23	171,044	114	4	109	1	1	229	385	— 40.5	1,239,089	45	6	7	51	59	30
North	51	1	53	2	2	109	129	68	289,684	410	1	493	38	33	975	852	+ 14.4	2,627,752	121	5	21	126	100	78
West Central	13	3	13		8	37	37	24	71,903	104	16	213	1	20	354	335	+ 5.7	791,513	50	2	20	52	50	39
West	70		20		8	98	98	83	396,431	665	7	144		56	872	1,330	— 34.4	3,640,444	280	9	31	289	265	142
Panhandle	11	3	3			17	15	21	52,866	120	28	25		7	180	347	— 48.1	535,946	44	4	9	48	43	46
Upper Coast	12	1	21		1	35	27	27	245,767	150	6	145		1	302	411	— 26.5	2,294,815	80	2	4	82	68	52
Lower Coast	29	2	18			49	61	54	299,647	326	39	211	1	2	579	740	— 21.8	3,461,620	92	3	6	95	88	72
Southwest	9	1	17			27	38	33	118,041	132	14	190		1	337	388	— 13.1	1,365,057	34	2	4	36	33	28
South Central			6			6	7	12	16,871	9		49			58	100	— 42.0	171,054	10	1	3	11	11	11
Utah																			2		1	2	2	1
West Virginia	3	42	16			61	93	85	152,532	70	431	111		18	630	695	— 9.4	1,728,621	53	7	13	60	69	72
Wyoming	7		1			8	8	9	30,283	89	3	19			111	95	+ 16.8	466,820	60	5	6	65	47	44
Total U. S.	877	119	499	149	44	1,688	1,931	1,755	5,142,139	8,493	1,385	5,362	1,588	383	17,211	19,895	— 13.5	51,979,542	2,911	350	415	3,261	3,168	2,481

* Includes distillate wells. [1] Wells completed in 4 weeks, or 28 days, ended November 27, 1943. [2] Wells completed in 5 weeks, or 35 days, ended November 28, 1942. [3] Wells completed in 5 weeks, or 35 days, ended October 30, 1943. [4] Wells completed in 48 weeks, or 336 days, ended November 27, 1943. [5] Wells completed in 48 weeks, or 336 days, ended November 28, 1942. [6] Water input, gas injection, and salt water disposal wells.

Light and Heavy Fuel Oils Taken from Storage Despite Record Refinery Runs

Refineries of the United States, after having set a new record in the previous week, further stepped up crude runs to stills in the week ended December 4, to an unprecedented level of 4,331,000 barrels daily. This rate of operations was 571,000 barrels daily or 15.2 percent above runs in the corresponding week last year. It was 70,000 barrels per day more than in the week ended November 27.

Nevertheless, the plants were not turning out enough of either burning oils or residual fuel oil, and it was necessary to take relatively large quantities of those oils from already deficient storage; although production of gasoline was sufficient to make possible a substantial addition to stocks of that product.

Crude oil production was down 30,000 barrels from the previous week in averaging 4,384,000 daily in the week of December 4, but this rate was only 52,000 barrels under the all-time peak reached several weeks ago. It was 550,000 barrels or 14.3 percent above the output in the corresponding week a year ago. The states of the Southwest and California continue to account largely for the sharp gain over year-ago production.

Stocks of crude oil in the United States were lowered 108,000 barrels in the week ended November 27, to 239,761,000 barrels, but at that level were approximately 5,000,000 barrels or 2 percent higher than a year previously.

Production of gasoline totaled 13,325,000 barrels in the week ended December 4 and was up 687,000 barrels over the previous week's output, or nearly 100,000 barrels daily. The production was over 18 percent greater than in the week ended December 5 last year. Having increased 1,060,000 barrels during the week to a total of 71,040,000 barrels, gasoline stocks of the nation were close to the year-ago level on December 4. At that time they totaled 71,872,000.

Gasoil and distillate production increased to 4,714,000 barrels in the week of December 4 from 4,379,000 the previout week, a gain of nearly 50,000 barrels in the daily average. The output of the light fuels was about 90,000 barrels a day or 15 percent greater than that in the like week last year. But there occurred, nevertheless, a heavy withdrawal of 830,000 barrels from storage, an average of about 120,000 barrels per day during the week. The 45,357,000 barrels left on hand was over 3,000,000 barrels or about 7 percent less than the inventory on December 5 last year.

Residual fuel oil production of 8,348,000 barrels in the week of December 4 indicated a decrease of about 40,000 barrels in the daily average output compared with the previous week, although the production was approximately 160,000 barrels a day or 15 percent greater

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED Dec. 11	Dec. 4
Arkansas	79,400	78,450
California	796,600	789,750
Long Beach	30,750	31,100
Midway-Sunset	55,450	55,350
Kettleman Hills	42,000	41,250
Wilmington	95,400	97,500
Rest of State	573,000	564,550
Colorado	7,100	7,350
Illinois	225,450	221,100
Salem	27,450	28,850
Louden	32,900	35,950
Other New Pools	153,000	144,050
Old Pools	12,100	12,250
Indiana	12,700	13,500
Kansas	273,500	267,108
Kentucky	23,950	24,550
Louisiana	354,150	352,800
North Louisiana	78,700	78,800
South Louisiana	275,350	274,000
Michigan	50,100	53,750
Mississippi	47,000	49,300
Missouri	95	95
Montana	23,264	24,521
Nebraska	1,700	1,700
New Mexico	113,000	113,050
New York	13,000	13,050
Ohio	8,700	8,850
Oklahoma	325,150	322,600
Oklahoma City	50,350	50,250
Seminole Area	70,900	71,100
Rest of State	203,900	201,250
Pennsylvania	36,850	39,850
Tennessee	35	35
Texas	1,883,250	1,908,500
Upper Gulf Coast	520,450	521,250
East Texas Field	364,250	369,300
Rest of Eastern Texas	115,300	133,700
Lower Gulf Coast	191,200	193,500
Southwest Texas	79,200	79,300
South Central Texas	20,500	20,500
West Texas	354,500	357,000
North Texas	143,500	143,400
Panhandle	94,350	90,550
Utah	10	12
West Virginia	7,600	8,100
Wyoming	102,550	102,850
Total United States	4,385,154	4,400,871

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Week Ended	Runs to Stills Barrels Daily	Week Ended	Crude Stocks Barrels	Week Ended	Gasoline Stocks Barrels	Week Ended	Gas Oil & Distillate Stocks Barrels	Week Ended	Residual Fuel Oil Stocks Barrels	Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	[1]4,436	11-13	[1]4,331	12- 4	245,752	5-29	94,159	3-20	46,187	11-27	72,881	1- 2
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	62,143	11-27

TRENDS OF 1942 AND 1943

Trends in Week Ended:	Crude Oil Production Daily	Runs to Stills Daily	Stocks Week End	Gasoline Production Weekly	Stocks Week End	Gas Oil & Distillate Production Weekly	Stocks Week End	Residual Fuel Production Weekly	Stocks Week End
1942:									
January 3	4,038	3,961	244,440	13,797	92,987	3,855	49,357	6,918	95,857
January 31	3,871	3,848	250,740	13,292	97,810	3,817	40,674	6,640	91,189
February 28	4,016	3,675	259,373	12,131	105,635	3,799	34,547	6,813	88,285
March 28	3,820	3,667	263,208	11,663	105,624	3,661	31,756	6,344	83,045
April 25	3,581	3,506	257,073	10,535	102,897	3,267	29,240	6,869	81,107
May 30	3,877	3,522	255,023	10,478	95,355	3,034	31,384	6,993	79,628
June 27	3,719	3,581	253,364	10,713	88,396	3,549	32,851	6,615	77,304
July 25	3,691	3,658	249,262	10,864	82,281	3,647	35,966	6,796	77,816
August 29	3,964	3,697	249,007	11,300	80,831	3,850	42,060	6,875	78,034
September 26	3,909	3,802	242,785	10,954	80,550	4,215	45,954	7,094	78,943
October 31	3,901	3,731	239,266	11,153	79,159	.....	48,131	.....	79,166
November 28	3,878	3,736	234,850	11,269	78,854	.....	49,739	.....	77,796
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	4,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,838
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
Dec. 4, 1943	4,384	[1]4,331	.....	13,325	71,040	4,714	45,357	8,348	61,603
Dec. 5, 1942	3,834	3,760	[4]234,850	11,165	71,872	4,088	48,663	7,246	75,219
Change:									
In week	—30	+70	—108	+687	+1,060	+335	—830	—285	—540
In year	+550	+571	+4,911	+2,160	—832	+626	—3,306	+1,102	—13,616
In year	+14.3%	+15.2%	+2.1%	+18.6%	—1.2%	+15.3%	—6.8%	+15.2%	—18.1%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, November 28, 1942.

than that in the corresponding week last year. Within the week, it was necessary to take 540,000 barrels from storage—an average of nearly 80,000 barrels per day. The national inventory on December 4 amounted to only 61,603,000 barrels, which was 13,616,000 barrels or 18 percent less than the 75,219,000 barrels on hand December 5 last year.

Transportation and Oil Shortages Rule Markets

In spite of record-breaking refinery runs in recent weeks, there has been difficulty in meeting market demands for practically all petroleum products in all sections of the country, and instances in which quoted prices are not up to the ceilings are becoming rare.

On the East Coast the stocks of gasoline now are comparatively low, as are those of heating oil and residual fuel oil, while there is steady demand for all products.

Markets continue exceptionally tight in the Gulf Coast refining centers, with gasoline particularly hard to obtain. Some refineries are being held down in activity by the lack of adequate transportation facilities.

In the Western Pennsylvania refining district there has been further strengthening of the market for neutral oils, and additional refiners have advanced their quotations, further narrowing the range of prices toward the ceilings. Kerosine and burning oils continue in strong demand, and other products, too, are being well absorbed.

The extremely tight market situation in the Middle West has continued unrelieved, and most products are quoted at the established ceilings. Shortage of crude oil is importantly responsible for the difficulty in meeting market demands, but inadequate transportation also is a factor. Gasoline is particularly scarce, and there is a pronounced shortage also of distillate, which is forcing an increased drain on supplies of kerosine and range oil.

Refiners of the Mid-Continent continue to experience extraordinary difficulty in supplying most products. Inquiries are coming in from all sections seeking supplies of heating oil, but plant owners are unable to take advantage of this potential business, because of their limited output. Gasoline continues in strong demand, and some refiners have been seeking without success to obtain extra supplies of aviation gasoline from other refiners in filling their orders for that product. As in other districts, refiners and marketers continue handicapped by the shortage of tank cars.

Standard of Ohio Seeks New Capital for Expansion

Shareholders of The Standard Oil Company (Ohio) were notified recently of the corporation's proposal to issue $10,138,900 of cumulative convertible preferred stock subject to approval of shareholders at a special meeting called for December 22, 1943. Rights to purchase the new issue, which would rank on a parity with the company's outstanding 5 percent cumulative preferred stock, would be issued to common shareholders in the ratio of one share of the new $100 par value convertible preferred for each eight shares of common stock. The proposal asks that the directors be authorized to set the conversion basis and the dividend rate at the time the offering is made, but specifies that the dividend rate shall be not less than 4 percent and not more than 4¾ percent. The new stock would be callable at $105.

In connection with authorization of the new convertible preferred, stockholders are asked to approve the creation of 488,888 additional shares of common stock, a portion of which are to be reserved for satisfaction of the conversion rights. Any shares not so reserved would be available for issuance for oil producing properties and for other corporate purposes.

Application will be made for admission of the subscription warrants to trading privileges on the New York Stock Exchange.

"The purpose of the proposed issuance of the new preferred stock is to provide new capital for the expanding operations of the company," W. T. Holliday, president, said in the letter to shareholders accompanying the proxy statement. "The company has been making heavy capital expenditures for the last few years, largely for improvements in and additions to the company's refining facilities and for the acquisition and development of crude oil producing properties. It is expected that continued expansion in production activities and probable capital expenditures in the refining department, together with other capital expenditures, are likely to be too great to be paid out of the company's general funds. The company has no specific capital expenditures under consideration other than for the completion of its Houdry catalytic cracking unit, now under construction, and other than expenditures considered to be in the ordinary course of business or not of major importance."

In 1942, the company's net crude oil production averaged 1868 barrels per day. Since December 1942 crude production has been substantially increased through the acquisition of a number of proven producing properties in Mississippi, Arkansas, Kansas, Illinois and Texas.

The current year has been marked by extensive exploration activities in Michigan, Illinois, Kentucky, Kansas, Louisiana, Arkansas, Oklahoma and Texas, which have resulted in the discovery of several new pools. Current production of the proven properties, including that of the Adams Oil & Gas Company, which is now in process of acquisition, and of the newly developed fields now totals approximately 8500 barrels per day.

PIPE LINE REVIEW

Nixon Proposes Converting Texas-East Coast Products Line to Gas Carrier

A blue print for conservation, designed to harmonize divergent opinions on the natural gas line from the Agua Dulce Stratton area in Nueces County to Charleston, West Virginia, has been proposed by Maston Nixon of Corpus Christi. Nixon is president of the Texas Mid-Continent Oil and Gas Association, but made plain he spoke as an individual. His plan would utilize existing facilities to transport gas from the Texas Coast to the Appalachian area, and to more eastern points, thereby conserving, he said, in excess of 200,000 tons of steel.

"This spring the Defense Plant Corporation," said Nixon, "started construction on the 'litle-big-inch' products line. Designed to carry oil products from the Upper Gulf Coast of Texas to the Atlantic Seaboard, this line is completed to Norris City, Illinois; and is now being tested. The Eastern leg should be ready for operation by March, 1944.

"The line is 20-inch except for the 16-inch section from Beaumont to Baytown on the Houston Ship Channel. Defense Plant Corporation, in order to provide outlet for at least some part of the Lower Coastal crude, purchased from United Gas Corporation a 14-16 inch line from Refugio to Houston. This segment was reconditioned and is now operated by Humble Pipe Line Company for this purpose.

"Last winter and spring we were fighting a losing battle with the submarine. The lines provided a hedge against possible failure to whip the underseas' menace. But the fight on the submarine has been successful. Once more tankers are plying the Gulf. The Intracoastal Canal from Corpus Christi to Houston is in operating condition, and the program for deepening and widening well advanced. Small tankers are available for shipments between the two areas. Products are not now available for the products line due to the resumption of tanker service. This is not only true of the in-Texas segments but of those sections of the line up the Mississippi Valley, and to the East.

"By construction of 52 miles of high-pressure 14-inch line from the Agua Dulce-Stratton area in Nueces County to Refugio to tie into the converted gas line now owned by the Defense Plant Corporation (which would be glad, I am sure, to relinquish ownership), a complete line for the transportation of natural gas would be available—not only to the Appalachian region, but all along the North Atlantic Coast.

"The 'little-big-inch' could be used for products, and the converted gas line from Refugio to Houston could be used for crude until September, 1944, if desired. If its conversion was delayed until that time, no hardship would be imposed upon those who propose to build the 24-inch line, as this line, if built, will not reach the Appalachian area until that time anyway. So, why build another line when one has been, or will soon be, completed, but not needed for its originally intended purpose?

"We are constantly reminded of the dwindling oil supply. And why is the supply dwindling? Simply because the oil industry has been denied the necessary tubular goods to drill wells. The 200,000 tons of steel released would provide for 2500 additional wells.

"Those of us who have looked at

this problem realistically, recognize that the owner of property has a right to enjoy its use, and that the owners of the gas reserves in Southwest Texas should not be required, under duress, to hold these reserves for the benefit of future generations.

"The adoption of this plan will not impair that right. Under the plan proposed, the draft on the Gulf Coast natural gas reserves would be distributed, and not concentrated in the immediate Corpus Christi area. Withdrawal from this immediate area would be held to one third of the capacity of the 24-inch line. Another third would be taken from the Upper Texas Coastal fields. The missing third would be reserve, a word we must never lose sight of.

"Such industrial development as we have enjoyed has been due to one dominant and compelling factor—cheap fuel at tide water; not one-cent gas, but five-cent gas. Exhaust the gas reserve from this country and we will lose what industry we have. And when the fact becomes known that our supposed inexhaustible supply is threatened by unwise withdrawal we can forget our dreams of future industrial greatness.

"Now let's look at another side of our Nation's fuel reserves. I am thinking of coal. Like our nation's oil, coal is a tangible—a very tangible fuel reserve. Specialists tells us that the Appalachian area has an amount sufficient for the next 3000 years. Transporting natural gas to that area, so rich in coal deposits, is 'carrying coals to Newcastle' with a vengeance."

Illinois Domestic Gas Users Face Shortage

The heart of the Illinois oil fields is threatened with loss of natural gas supplies and domestic users of the gas will be compelled to convert to a substitute fuel after May 1, the Illinois Commerce Commission has disclosed.

When May 1, 1944, comes around, the oil companies and the public in the area of Salem, Centralia and Mt. Vernon "will face a serious problem" the commission said.

In the last few years there has been a general conversion from artificial gas in those communities to natural gas supplied from the nearby oil fields.

"Partly because of reduced output of gas, and partly because of increased use of the gas by the producing companies for operation of refineries and for repressuring oil wells, it now appears that these communities will have to find substitute fuels," a commission announcement said.

The commission assured continuation of supplies of natural gas to some 7000 domestic consumers in these oil field towns until next May 1 when it sent an engineering staff into the field recently.

In conference with representatives of the War Production Board and the Petroleum Administrator for the War, an agreement was worked out whereby representatives of The Texas Company, Warren Petroleum Corporation, and Sunflower Petroleum Products Company agreed to maintain necessary supplies for the winter.

The Illinois Commerce Commission has received assurances from federal authorities that necessary cooperation will be given to provide critical materials required for conversion to whatever other source of fuel is decided on.

Claim Texas-West Virginia Gas Line To Develop Chemical Industry in Texas

Construction of the Texas leg of the South Texas - West Virginia pipeline, which will bring gas to armament plants in the Appalachian region, was started December 6 when dirt was turned for the Guadalupe River crossing in Victoria County. Coincidental with the start of work, Gardiner Symonds, president of Tennessee Gas and Transmission Company, operators of the line, predicted its construction would give great impetus to the expansion of Texas' infant chemical industry.

While the immediate necessity for the line is dictated by the exigencies of war, the line has great potential peacetime values to Texas, Symonds said. The line is being built under directives from the War Production Board and the Federal Power Commission as an essential part of the war program and the company has been directed to complete the line so gas will be available by next winter, "to prevent interruption in war production which otherwise would occur." Symonds said the company hoped to have the line completed by next August 31, three months in advance of the deadline.

The impetus of the Texas chemical industry will result from stripping the gas before the gas is placed in the line. The stripped hydrocarbons will provide the raw materials for the chemical industry and The Chicago Corporation, of which Tennessee Gas and Transmission is a subsidiary, has under consideration plans to spend an estimated $5,000,000 to establish new plants and processes to utilize these gas by-products.

"Only the heat values in the gas will be sent through the new line," Symonds emphasized. "We now have in operation cycling plants in South Texas from which we are removing the propane, butane and heavier hydrocarbon fractions. These fractions now are being utilized in manufacturing high-octane gasoline and other war essential products or are being returned to the ground to be kept in natural storage until they can be properly developed. The company now is puting back into the ground 350,000,000 cubic feet of gas per day after removing the hydrocarbon fractions while only about half of that volume of heating gas will be run through the pipe line."

The establishment of a chemical industry on a sound basis is feasible, practical, and certain in Symond's opinion, and will result in expanded payrolls, tax values and generate collateral business which will be of long range benefit to the state. "With the development of the new gas line and additional demand in the South Texas and Gulf Coast areas for industrial fuel gas, it will be possible to cycle additional gas and thereby add to the raw material supply for the chemical industry. The Chicago Corporation is prepared to install additional recovery units as needed," Symonds said.

Asked "why take Texas natural gas to an area which has huge coal reserves?" Symonds stated that "apparently the WPB and FPC drew a sharp difference between the 'reserve' of coal and the 'supply' that could be made available for war purposes." He pointed to a statement made by the Solid Fuels Administrator in mid-September in which Secretary Ickes stated "coal production has been unable to keep pace with the expansion of war requirements. . . .there is a far better chance that the situation will grow worse before it grows better because the coal industry faces strict limitations despite any efforts which can be made to raise production levels."

Magnolia West Texas Line Ahead of Schedule

A substantial boost in the pipe line outlet for West Texas will materialize before the end of the year through Magnolia Pipe Line Company using sections of its 337-mile 12-inch line that parallels the company's 8-inch carrier between Midland and Corsicana as temporary loops. Construction work on the 12-inch, which will have a capacity of 42,000 barrels daily with only 3 stations, is ahead of schedule. Contractor on the Midland end has welded 63 miles, using only one spread until December 7 when a second crew began work at Clyde. The Midland-Iatan 45-mile sector will be pressed into service as an auxiliary loop to the old system shortly, and this temporary loop will be increased to 100 miles before end of year. The welding crew working west from Corsicana has complete 31 miles of line, and the company will use the Merten-Corsicana 25-mile sector as a temporary loop. Unless weather conditions interfere, the line is due to be in full operation by February 1.

Talco Pipe Line to Extend Line from Camp County

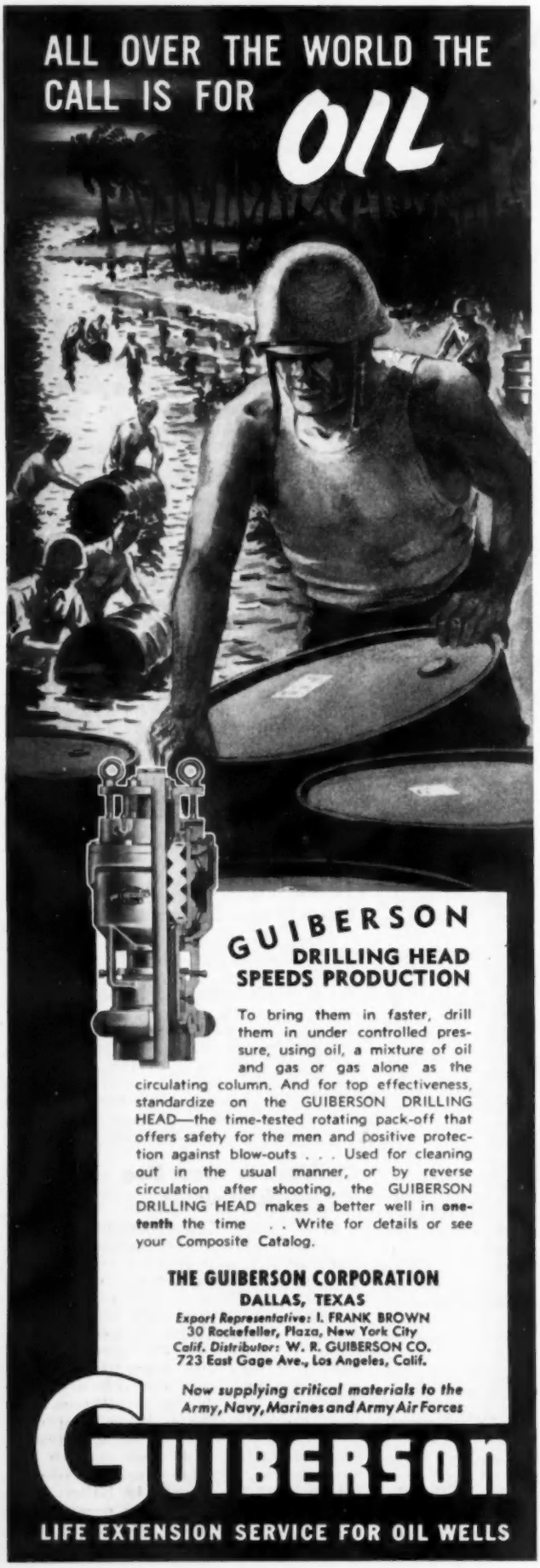
Talco Pipe Line Company, Dallas, has assembled materials for the immediate construction of a 9-mile 4-inch crude line to extend from the Pittsburgh pool, Camp County sector of Northeast Texas, thence northwest to intercept the company's 6-inch carrier that delivers oil from Coke field to the Talco Asphalt & Refining Company's refinery at Mount Pleasant. The new line will traverse the New Hope deep area, which is served by Gulf Refining Company.

California Gas Use At Peak Figures

California producers currently are getting high returns from natural gas output, consumption in that state having climbed to the highest rate of all time.

In the first nine months of 1943 total consumption topped 221 billion cubic feet, which was about 15.3 percent more than the total for the corresponding period of 1942. For September the aggregate figures were upwards of 24 billion cubic feet, higher by 23.6 percent than those for September of last year.

While all categories show advance, the outstanding gain was made in the use of natural gas for generation of electric power. The nearly 4.6 billion cubic feet of gas that went to the power house boilers in September contrasted with 816 million in September, 1942.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International Developments

Canadian Oil Production Remains Steady

Crude oil yields from fields in Canada have remained at a very uniform rate for the past three years, according to figures released by the Dominion government. Official figures show total production during the first 9 months of 1943 to be 7,521,969 barrels, an average of 835,552 barrels per month. This compares with 10,363,801 barrels for all of 1942 (monthly average of 863,567 barrels), and 10,133,838 barrels in 1941 (monthly average of 844,486 barrels). More than 93 percent of all production in Canada represented by the above figures originates from Turner Valley limestone wells.

Athabaska Tar Sands Vary In Bitumen Content

W. B. Timm, director of mines and geology, in an appearance before the reconstruction committee of the Canadian House of Commons, stated that the Athabaska sands exhibit a wide variety of richness, and that extensive study remains to be done on them in order to establish any authoritative estimate of their reserve content. He referred to the widely-published estimate of 42-billion-barrel reserves in the field as being based on incomplete surveys, and on only preliminary results of non-commercial extraction processes.

Supplementing its original grant of $500,000 for developing the McMurray tar sand deposit, the Dominion government has appropriated another $350,000 to keep the project going and to put it on a commercial scale of operation. The pilot-scale separator plant, built by Abasand Oils, Limited, is being enlarged, and a large power plant is under construction. Both units are scheduled for completion, ready for full operation, before the end of the current year.

New Drilling Equipment In Use in Bolivia

Use of modern drilling equipment has increased the hole-making rate 500 percent in the Bermejo area, where the Bolivian Development Agency is seeking to complete a number of wells at the earliest possible date. The drilling campaign is aimed at swelling Bolivian oil exports to Argentina, where refineries are running at only fractional capacities. Drilling equipment previously used in developing the Bermejo fields averaged only about 11 feet of hole daily. No modern rigs have previously been seen in the area.

New Gas Sand Found In Northern Mexico

Deeper drilling in the Chiltipin gas field, in the northeastern part of the Mexican state of Nuevo Leon, has uncovered a new and deeper pay sand in the Carrizo formation, between 3672 and 3680 feet. It shows 2280 pounds of pressure. Deepest previous gas production in the field has been from a Mt. Selman sand at 2780 feet.

Canada Insists on Terms Of Canol Agreement

Canadian officials are showing some resentment to the strong reaction in the United States regarding the Canol project. This has led to semi-official statements to the effect that Canada will insist on the terms of the Canol agreement as originally worked out between authorized representatives of the two countries.

This statement of intention is in answer to the recent demand of Petroleum Administrator Harold L. Ickes for a post-war share of the oil and products to be produced "upon terms commensurate with the magnitude of the contribution made by the United States."

The Canadian government does not expect to be forced into the position of having to make a stand, since it regards Ickes' statement as the opinion of one man.

Canadian official spokesmen point out that the whole project was conceived and executed by the United States. The United States government and the Army asked the permission and cooperation of Canada in facilitating the scheme, and secured immediate and favorable response. Canadians feel that they yielded in good faith to military and naval appeals in an emergency situation and should not now be criticized or penalized for such a friendly act.

Bureau of Mines Honors Three Workers for Achievement

Recognizing the outstanding assistance given the petroleum and natural gas industries by three veteran employees of the Bureau of Mines, Secretary of the Interior Harold L. Ickes on December 4, 1943, granted them "awards of excellence" for their contributions to wartime services rendered by the department on the home front.

The men, all members of the Bureau's Petroleum and Natural Gas Division, are Harold C. Miller, senior petroleum engineer, 6109 Contra Costa Road, Oakland, California; William M. Deaton, senior chemist, 1117 Broadmoor, Amarillo, Texas; and Ellis M. Frost, Jr., chemical engineer, Shiprock, New Mexico. Miller, who is at the top of his civil service grade, will be recommended for a job reclassification upward. Deaton and Frost will receive annual salary increases of $200 each.

Thus far, 18 employees of the Department of the Interior have been rewarded for their special achievements.

The efficiency of recovery of oil from underground pools depends largely on the manner in which reservoir energy is used to move oil through the reservoir sands and porous rocks to the wells. To determine whether a slowing down or a speeding up of the rate of recovery increases (or decreases) the efficiency of recovery, a yardstick is needed to gauge the relative recovery efficiency following changes of field operation. Miller's work has made it possible to develop such a yardstick.

His study of the producing performance of a large number of petroleum reservoirs on which pressure-production information was available revealed a method for determining the source or sources of energy driving the oil toward wells and the effect of changes in field operations (such as increasing or decreasing the rate of production) on the efficiency of oil recovery. Miller found that when cumulative decline of pressure in underground petroleum reservoirs was plotted on logarithmic charts against cumulative oil produced, the relationship between them is definable by straight lines for large increments of production. The lines have different slopes, and the slope angles, when studied in conjunction with the physical characteristics of the oil and type of reservoir, are capable of revealing whether the source of energy driving oil through the sands and porous rocks to the wells is the result of gas expansion, natural water-drive, or a combination of both. By the development of pressure-production plots, the producing performance of petroleum reservoirs, for the first time, can be represented graphically and the relative efficiency of different methods of field operations determined.

The war has limited the construction of new pipe lines for natural gas, but likewise had caused an enormous increase in demands for the fuel. As a result, existing lines are operated at higher pressures and the danger of gas hydrate thus has grown. These chemical compounds of natural gas and water formed under pressure, produce ice-like constrictions which decrease or even stop the flow of gas. Deaton and Frost developed a simple, practical, and reliable device which determines the temperature at which natural gas will condense from natural gas under pressure. Gas transmission companies now are able to make frequent tests of the efficiency of gas dehydration plants in removing water vapor from gas before it enters the pipe lines, thus avoiding serious interruptions.

Between 100 and 150 of these instruments are in use and their "insurance" value is incalculable. They are suitable for pressure from atmospheric to 2500 pounds per square inch. Since the government has shop rights on the dew-point apparatus, without royalty, the device also has been of considerable monetary value to federal agencies. Government use of the apparatus in connection with helium production for the war has been extensive and it has enabled the production of natural gas and helium extraction to be carried on without interruption.

East Texas Chapter of API To Hold Meeting in Kilgore

The fall meeting of the East Texas Chapter of API, Division of Production, will be held at Kilgore, Wednesday evening, December 15, at eight o'clock. Preceding the business meeting at which officers for 1944 will be elected, there will be a pre-meeting get-together and banquet.

Appearing on the program will be Beauford Jester, chairman of the Texas Railroad Commission, who will talk on "Texas Oil." Also, A. S. Ross, engineer for The Texas Company, will read a paper on the "Theory and Practice in Equipping and Operating Pumping Wells." Warren L. Baker, editor of THE OIL WEEKLY, will start the program with a talk on "Increasing Responsibility and Opportunity of Petroleum Technical Men."

Drop in Texas Brings U. S. Output Down

Due largely to a decrease in Texas production, the output of crude oil in the United States during the week ended December 11, failed to equal the total of last week by 15,717 barrels. Total production this week was 4,385,154 barrels.

Harold C. Miller

W. M. Deaton

Ellis M. Frost, Jr.

U. S. Field Operations

Illinois

New Aux Vases Pool Opened in Wayne County

Wayne County was the bright spot in an otherwise dull Illinois oil picture this week.

Felix Jablonski opened a new pool in the county with Orndorff 1, NW NW 3-1n-9e, which proved much better than a drill stem at first indicated. The well, when tested in Aux Vases sand at 3104-19 feet, the latter figure total depth, filled 2700 feet with oil in 24 hours after a 30-quart shot. It was then shut in to await erection of storage tanks.

Robinson and Puckett extended the Clay City pool two miles with production from Rosiclare and McClosky lime at Gordon-Muhlbach 1, 1-1n-8e. The well produced 127 barrels of oil in 24 hours from the two pays after 4000 gallons of acid. Total depth is 3128 feet.

Comanche Oil Company's Felix Heirs 1, SE SE 2-2s-6e, hailed as a prospective discovery a week ago after oil was recovered on a drill-stem test of McClosky lime, has been abandoned at 3403 feet.

Jefferson County: J. W. Murchison's Sledge 1, SE SE SE 34-3s-2e, two miles north of Nason in wildcat territory, was completed in the Rosiclare lime. The well pumped 33 barrels of oil in 24 hours.

E. M. Self has set casing at Jefferson Oil and Gas Company 2, S ENW NE 32-3s-2e, northwest of the Key pool, for a test of streaked saturation in the McClosky lime. A show of oil also was found in the Benoist sand. Total depth is 2478 feet.

Shelby County: The Texas Company's Ferguson 1, NW SW NE 18-11n-6e, a wildcat three miles southeast of Windsor, is drilling below 3132 feet after passing through the Carper sand enroute to the Devonian lime. No shows have been found.

Coles County: The latest test for oil on the large Mattoon structure, which has produced little oil, has been abandoned as dry through the McClosky lime at 2175 feet. The well was thoroughly tested but no commercial shows of oil were encountered.

Indiana

Posey County Discovery Well Still Testing

Indiana's operations this week totaled 75 an increase of 2 from last week and the work included 39 wells drilling, 20 locations, 10 inactive tests and 6 rigging tools. First reports totaled 6, and 3 of those were wildcats.

The most interesting test was Bennett Brothers' Spencer 1, NE SE SW 32-6s-14w, Posey County, 3½ miles west of the Mt. Vernon pool, which is still testing Tar Springs sand which vielded 15 barrels of oil per hour on swab tests through casing.

Wildcat operations totaled 33, including 13 wells drilling, 11 locations, five wells rigging tools and 4 inactive tests.

One oil well was completed with total initial production of 44 barrels daily. Two holes were dry. The most active pool in the state was Trenton.

Kentucky

Field Activity Takes Big Spurt in Week

Kentucky oil activities spurted this week with operations jumping from 74 to 85.

The operations included 69 wells drilling, 8 locations, 7 wells rigging tools and 1 inactive test. First reports totaled 19 as compared with 8 a week ago. Eight wildcats were included in the first reports.

Wildcat work moved up from 24 to 32, of which 26 were drilling, 4 were rigging tools and 2 were locations.

Five oil wells were completed for total initial production of 426 barrels daily. Three wells were dry. The Huntsville pool was most active in the state with 6 operations.

Kansas

Drilling Shows Decline with No Important Developments

Operations in Kansas failed to develop a new pool, and the usual shows were lacking from most sectors. Continental Oil Company developed shows in Bruggeman 1, NEC NE 5-10-20w, which is drilling as a stratigraphic test. The Arbuckle returned a moderate show of saturation at 3826 feet with the bottom of the hole at 3846. The logged oil will be given a test. This well is on a fairly large block of leases in the Zurich area of Rooks County.

Dickinson County: An interesting test is getting under way at Transwestern Oil Company's Meuli 1, SWc 1-15-2e, in the south-central sector of the county. Burgess, Bartlesville, Mississippi and Arbuckle are the most favorable strata in this area.

Stafford County: A small pool with the discovery rated as a minimum well has been opened in Hershfield et al's Heyen 1, CNW NW 24-22-12w, which made 96 barrels of oil and considerable water from the Arbuckle lime at 3654 feet, after treating with 750 gallons of acid. Simpson and Viola, which in this area are possible producing horizons, failed to return shows.

Graham County: J. J. Lynn's Webster 1, NWC NE 34-10-22w, on the south line of the county, had a number of shows of oil in returns from 3614 to 4101 feet, total depth. Earlier, some dead oil was found. The Arbuckle was topped at 4050 feet.

Gove County: Globe Oil and Refining Company's Snyder 1, SEC 8-14-29w, an off-trend location, found shows in both Viola lime and in Kansas City-Lansing but is drilling ahead.

Oklahoma

Shallow Gas Well Indicates New Field and More Drilling

Another in the chain of small and shallow gas fields was opened last week by E. McLennon and R. C. Moss, independent operators, at their Nelson 1, SE SE SW 30-6n-21w, south of the minor oil and gas production developed as Granite field, Greer County, in the southwestern area of the State. The test developed an openflow of slightly more than 1,000,000 cubic feet daily from sand at 650 feet. Wells in this area have an irregular section to drill with granite wash to be anticipated at any level, and solid granite at 2500 to 3500 feet.

Cleveland County: The second test in the new field proven by Mid-Continent Petroleum Company's Harris 1, west of Moore, has supdded as Harris 2, NE NE SW 29-10-3w, this being a 40-acre north offset to the discovery. In the meantime, the discovery is being produced at 250 barrels daily with a 14-mile line having been laid to the Oklahoma City field pumping facilities. Recent sales of State school land leases in the area brought unusually high bids.

McClain County: Carter Oil Company's Johnson Ranch 1, CSW NE 13-8n-4w, found a show of oil in the Pennsylvanian sand at 8724 to 8729 feet and is drilling ahead. This important wildcat test is located upon a well-defined anticline that has been detailed by seismograph. The well is a deep test with the Wilcox sand as an ultimate goal.

Logan County: Gulf Oil Corporation's Prichard 1, C NW NW 22-17-3w, east of Crescent, which gave indications of being a pool opener in Layton sand a week ago, is swabbing and testing after an initial gauge showed 72 barrels in one hour and about 120 barrels in nine hours on the swab. The initial flow quickly died and the test is not as favorably regarded now as when the pay was first drilled. Depth is 4770 feet after plugging back from dry Wilcox at 6306.

Oklahoma County: The West Edmond field has been defined to the southwest by finding brine at H. J. Schmitz et al's Meeker 1, C NE NW 6-13-4w which perforated casing at 7033 feet opposite Hunton lime. Operator will squeeze perforations and attempt to get above the water table with higher perforations.

Highland Oil Company Buys Pearsall Field Properties

Purchase of Falcon Seaboard Drilling Company's properties in the Pearsall field of Frio County by Highland Oil Company of San Antonio was announced last week.

Consideration of the trade was not revealed, although it was understood that it was for cash. Eight producing wells and approximately 400 barrels daily production were involved. The wells are located on leases which total around 5000 acres. The field produces from the Navarro sand.

North Texas

Clay County Discovery Flowing from Mississippian

Shell Oil Company's Wynn 1, recent Clay County discovery, flowed 666 barrels of oil and 16 barrels of water through open tubing in eight hours after using 4000 gallons of acid through Mississippian perforations at 6190-6253 feet.

In the Burns-Midway pool, L. T. Burns et al's Lutz 1, northeast offset to the discovery, abandoned at 6010 feet without shows in the Mississippian.

Wichita County: Minor north and east extensions given the West pool, near the northwest edge of Wichita Falls, by natural flowing wells in the Strawn sand indicate that a substantial producing area is awaiting development. Continental Oil Company recorded its fourth consecutive producer when West 3, 990 feet north of its discovery, flowed 120 barrels daily on a 12/64-inch choke from saturation at 4258-88 feet with the well bottomed at 4290 feet. Ohio Oil Company's Barner 1, enlarged the pool to the east in flowing 95 barrels daily on a 14/64-inch choke from sand at 4238-53 feet with lime to 4266 feet.

Montague County: Continental Oil Company's Spencer 1, E. Green Survey and a wildcat discovery situated 2¾ miles north of St. Jo, pumped 21 barrels of oil and no water on an initial test after a shot of 10 quarts of nitro in Strawn sand at 2774-78 feet, having plugged back from schist at 4342 feet. The company's First National Bank of St. Jo 1, southeast corner of J. Lobley Survey and a mile southeast of the above strike, drilled one foot of oil sand to 2934 feet, and was running pipe. Both prospects are on a strike between the Bowers and Muenster areas, and a series of small pools are anticipated. Continental Oil Company's Richardson 2, south extension for the Mueller two-pay pool, recorded the largest potential with rated flow of 1121 barrels of 42-gravity oil natural through ½-inch, from perforations at 6038-48 feet in the Bend lime, topped at 6028 feet. The area has 3 wells in this zone and 2 in the Simpson. The company's Miertschien 1, ½-mile north by west of production, correlates 20 to 30 feet low on pre-Strawn markers in drilling to water in the Ellenburger at 7381-7462 feet, and will plug back to the Bend lime at 6010-20 feet.

West Texas

Deep Drilling Program Nearing Decision

The aggressive deep drilling program undertaken several months ago along a fairly narrow trend across Ward, Winkler, Andrews and Gaines counties and situated west of the central platform region is now nearing showdown levels for a number of the tests. Four one-well Ellenburger pools in the former two counties are also involved. Ordovician prospecting is steadily growing in volume with all sections of the Permian Basin participating. Pending projects include two in Reagan County. Crockett County will participate through the starting of Watchorn Oil & Gas Company's Thompson 1, near the northeast edge of the Yates field and a strategic location for deep production, based on information gained from near misses on the east and west sides of the structure. J. D. Bodkins et al have scheduled an Ellenburger test in H&TC 46, Block 35, near the Crane-Upton County border and on short-term acreage held by Shell Oil Company. In Pecos County, J. L. Greene et al have obtained contributions towards a test in H&GN 27, Block 10.

Discovery Gauge: Bryce McCandless et al's Cordova-Union 1-101, Owego prospect, Pecos County, flowed 250 barrels of 35-gravity oil on 22-hour test through chokes, varying from ¼-inch to 2-inch, thus revealing a better well than indicated late in November. Production is from Ellenburger perforations at 4012-37 feet, and the zone was treated with 2000 gallons of acid. Discovery is on acreage farmed out by Gulf Oil Corporation, and the production perpetuates more than 2000 acres in the general area for the latter. In Hockley County, Woodley Petroleum Company's Harless-Stanolind 1, prospective Clear Fork strike, will be equipped for pumping completion after plugging back from 6000 feet to 5980 feet.

Pecos County: Possibilities of a production trend between the Abell and Apco deep areas brightened when Globe Oil & Refining Company and Forest Development Corporation's Colden 1, an intermediate prospect, yielded 100 feet of gas-cut and 90 feet of oil-cut mud when tester was used at 5257-93 feet in Simpson, topped at 5145 feet with elevation of 2419 feet. This wildcat will be carried to Ellenburger.

East Texas

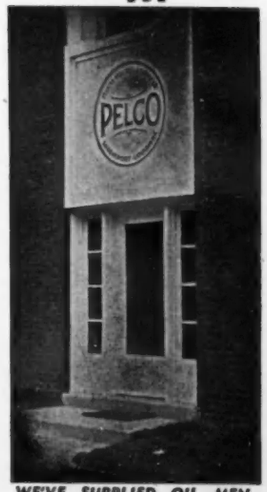
Lower Glen Rose Promising In Manziel Pool

A production blowout threat from the Lower Glen Rose was experienced by the Sand Flat prospect, but the same formation is showing production possibilities from a first deep test in the Manziel pool. Van Zandt County's first deep strike may not be a commercial pumper.

Smith County: The payment of virtually proved-acreage prices for leases and royalties on the Sand Flat structure in recent months by late entrants received more justification when Skelly Oil Company's Chisum 1, Daniel Minor Survey, showed light green oil with gas in rotary returns in penetrating the Lower Glen Rose section to 9285 feet. Formation cuttings indicated first porosity and saturation at 9060 feet followed by pay at intervals with main porosity possibly in the last 30 feet of penetration. The well has repeatedly threatened to blowout, thus precluding a drill stem test with open hole below 2777 feet. Chisum 1 had previously confirmed the opening of a Paluxy oil area of substantial proportions in filling 6000 feet with 24.6-gravity oil in 1½ hours when a tester was used at 6972-7007 feet. This same zone, although about 290 feet lower structurally, also indicated production in drilling C. L. Wickliffe-W. L. Patrick et al's Hackett-Pure 1, situated 3½ miles to the north. The latter was junked at 9852 feet in the Rodessa sand, topped at 9680 feet with

The Beginnings of Fascism

We are frequently chided for criticism of federal officials and bureaus. We see in this a crisis. Since the Constitution was written great men have said one of the duties of citizenship is to express opinions freely on men and matters of state. It is said that government now owns one-third of the area of the United States and it certainly owns or has subsidized too much of industry. These things, along with curtailment of free speech, are the beginnings of Fascism. And Fascism would not look with favor on free private enterprise in the oil industry. For the first time in 35 years we feel a bit self-conscious when we suggest that men who buy supplies and equipment TRY PELCO FIRST. It could smack too much of private initiative.



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evidence of low-gravity, or dead oil, according to the electric log. Skelly Oil Company's prospect logged the base of massive anhydrite at 9045 feet with an elevation of 432 feet, thus increasing its structural relief to about 400 feet as compared to the junked test, and is due to be carried to 10,000 feet unless a compromise is made with contributing companies. Sun Oil Company's Patterson 1, situated ¾-mile west by south is drilling shale at 2910 feet.

Manziel Pool: Shell Oil Company's Whatley 1, southeast outpost for this Paluxy oil sand area, logged nominal oil stain and odor at intervals below the massive anhydrite zone at 7860-8061 feet with best porosity at 8494-8504 feet. However, five attempts to make a drill stem test at 8505 feet failed, and it was coring at 8560 feet to continue to the Travis Peak. R. J. Caraway and Rogers Lacy's Rape-Magnolia 1, northeast extension sector, pumped 498 barrels of 33-gravity oil initial from Paluxy perforations at 6350-90 feet. Sun Oil Company's Johnson 1, a nearby test is drilling at 5750 feet in the Georgetown, topped at 5073 feet, or 38 feet high to the nearest well.

Wood County: Wildcatting in this county registered a sharp gain through the starting of Roeser & Pendleton Inc.'s White 1, a mile west of Mineola, to explore the Paluxy. H. L. Hunt Oil Company's J. W. Kennedy 1, A. C. Walters Survey and 2 miles northwest of Quitman, is contracted to the Paluxy, but may continue to the Travis Peak. The same objectives are involved in drilling of Magnolia Petroleum Company's Kate Lindley 1, Sarah McDonald Survey, near Yantis. Danciger Oil & Refineries, Inc.'s, Sparks 1, Winnsboro area, entered the Paluxy at 6720 feet with an elevation of 524 feet, and was coring without shows at 6750 feet. Gulf Oil Corporation's Brewer 1, in the same sector, topped the Paluxy at 6329 feet, or 346 feet high, and was drilling at 6905 feet in the Upper Glen Rose, topped at 6682 feet. Plains Production Company's Cox 1, Alba prospect, set a protection string at 2512 feet, and is drilling at 8520 feet in the Rodessa. Roy Golston et al's Riley 1 is drilling Basal Woodbine at 6050 feet. Moncrief Bros. and C. E. Hyde's Simmons 1, a mile east by north of Golden, attracted attention through logging oil saturation in the Sub-Clarksville 4575-4605 feet with an elevation of 442 feet, and is drilling at 4680 feet.

Rusk County: Beacon Oil & Refining Company and American Liberty Oil Company's Brown 1, situated 2000 feet east by south of their discovery oil well for the Henderson deep area, tested 1,500,000 feet of gas with 75 barrels of 58.8-gravity distillate spray after using 1000 gallons through perforations at 7244-64 feet, being opposite the lower pay in the Pettit. This second well is 8 feet high to the discovery, and perforations will be made opposite the upper porosity. The Texas Company's Christian 1, wildcat, failed to confirm oil shows in taking sidewall cores in the Lower Glen Rose, and landed 5½-inch liner at 6827-6540 feet to test through perforations, having plugged back from the Travis Peak at 6945-7123 feet. N. H. Wheeless et al's Walker 1, 9 miles northeast of Henderson is drilling at 6475 feet with the base of massive anhydrite at 6256 feet.

Deep Test: Delta Drilling Company et al's Texas Pecan Nursery 1, J. M. Arnest Survey, 5 miles south by west of Chandler, Henderson County, is contracted to drill to 10,000 feet. Four companies have contributed $70,000 towards this test.

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Texas Panhandle

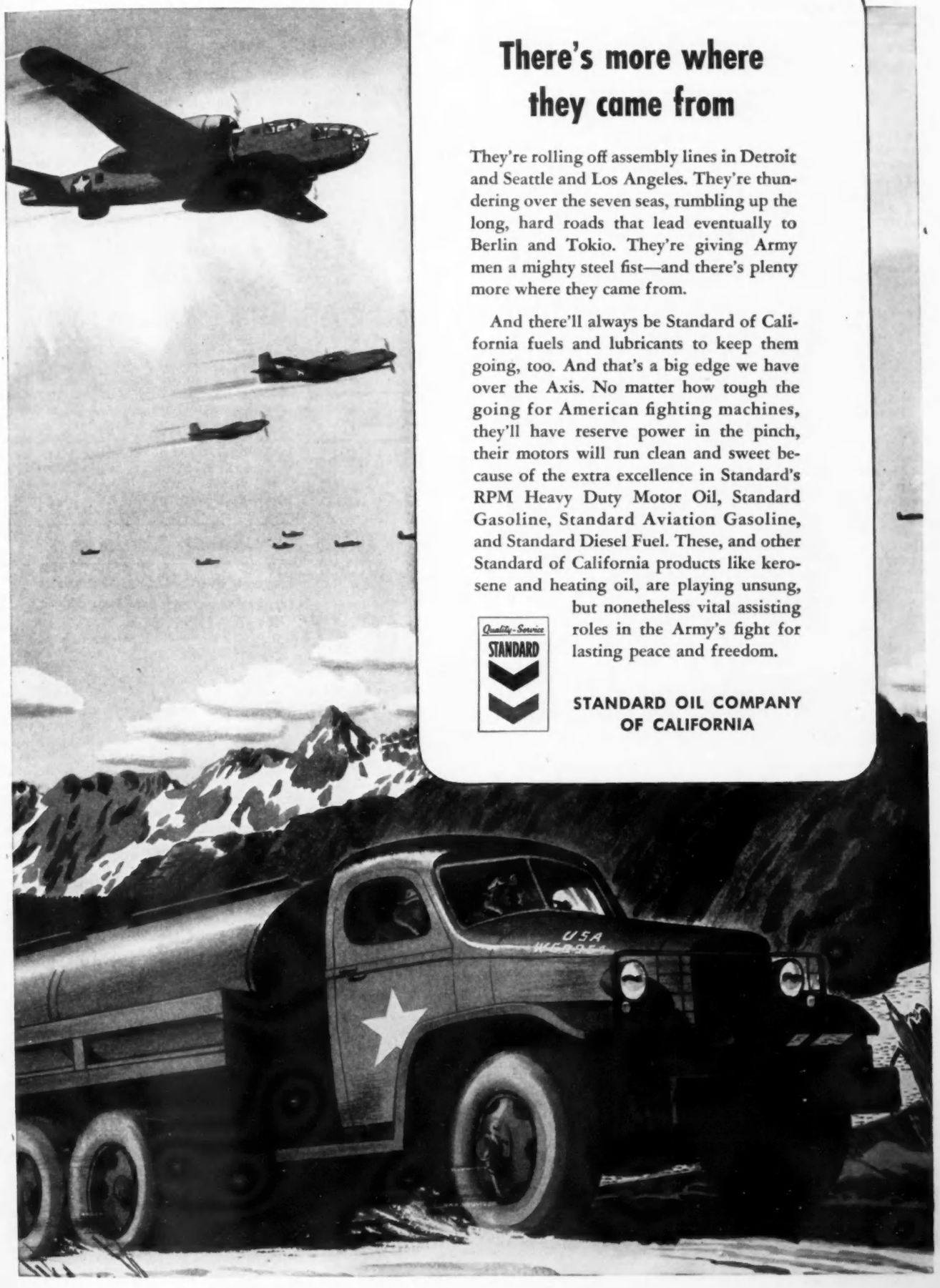
Parmer County Deep Test Hits Granite

Stanolind Oil & Gas Company's 3-well wildcat program on large blocks in the Texas Panhandle received a setback when its Jarrell 1, Bovina area, Parmer County, drilled into granite at 8161 feet.

In Oldham County, the Company's Green 1, situated on a 25,709-acre lease with a total of 130,000 supporting acres in the general area, was drilling limey-shale at 5265 feet.

A joint operation with The Texas Company on the Troy Broome 2570-acre lease, Donley County, 7 miles northwest of Memphis, was drilling lime and shale at 5950 feet. This prospect afforded some encouragement when drill-stem test at 4786-4866 feet yielded 50,000 feet of gas with a 3750-foot column of salt water.

Hutchinson County: Phillips Petroleum Company's Whittenburg 5, H&TC 63, Block 46, near the northeast edge of the regular Permain production south of the Canadian river, was drilling at 5075 feet in unidentified formation.



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Southwest Texas

Brooks County Test Has Shows at Four Levels

Humble Oil & Refining Company's Scott & Hopper 1, ACH&B 107, 4 miles northeast of old shallow Alta Mesa field in Brooks County, recovered oil and gas-distillate on several tests of sand logged at 6539-57 feet. A drill stem test at 6523 feet recovered 15 barrels of condensate and 4½ million cubic feet of gas per day with a gas-oil ratio of 60,000-1; at 6539-47 feet and recovery was 7 stands of 44-gravity oil with 1 jet of mud and water; at 6547-57 feet recovery was 11 stands of 43-gravity oil, and at 6600 feet recovery was approximately 4 million cubic feet of gas and 18 barrels of condensate daily. First test was in Vicksburg at 6311-14 feet and the recovery was 500 feet of pipe line oil with 40 feet of mud in 20 minutes, Hole is scheduled to drill to 8000 feet before completing. It is now being cored and drilled around 7000 feet.

Bee County: Magnolia Petroleum Company is opening a new oil field 2 miles southwest of Burnell Wilcox gas-distillate discovery with Ingram 1, James Richardson survey, testing for completion. Perforations were made at 6802-06 feet and the wildcat has been cleaning into pits through 9/64-inch choke.

Before setting 5½-inch casing to 6885 feet, a drill-stem test at this level recovered 720 feet of pipe-line oil and 160 feet of brackish water in 90 minutes. First perforations at 6820-20½ feet were squeezed to shut out water. A drill-stem test in open hole at 6811-14 feet recovered 1100 feet of pipe-line oil in 25 minutes. Operators are reported to have logged a gas-condensate sand at 6654-92 feet in the first Carrizo (Slick) sand and at 6750-84 feet in the so-called Luling pay. Other sands carrying gas odors were logged.

Goliad County: Fred W. Shield has opened a new field in the basal Frio sand section 4 miles southeast of Fannin townsite on the Goliad-Victoria County line, with Terrell 1 Antonio Siedeck Survey. Perforated at 4650-65 feet with 14 shots, the wildcat cleaned through 1/8-inch choke flowing an estimated 5 barrels of 23.9 gravity oil hourly. Tubing pressure mounted to 750 pounds, casing 1600 pounds. Hole is bottomed at 5203 feet with 5½-inch casing set to 4850 feet. It was shut in for storage after cleaning. Another well is planned for immediate drilling.

San Patricio County: Republic Natural Gas Company is completing its new field discovery or extension 1 mile west of Taft field, at Hancock Insurance 1, which flowed 100 barrels of pipe line oil daily through 5/64-inch choke from perforations at 4913-16 feet. Tubing pressure mounted to 450 pounds, casing 700 pounds. Another oil sand was logged at 4905-09 feet while a test at 4917-21 feet showed salt water. The well is bottomed at 4939 feet with 5½-inch casing set on bottom.

Texas Gulf Coast

Shell to Test Huffsmith Area With Deep Well

One of the deepest Wilcox wildcat tests ever drilled in Harris County is planned for the Huffsmith area. Shell Oil Company has announced it will drill Holderrith 1, on its 40-acre tract in the George Galbraith survey. There is considerable interest in the drilling of this test and it will be watched closely for its Wilcox sand possibilities. Location is 2800 feet northwest of H. J. DeArman's McDonald 1, 6115-foot dry hole. Shell is projecting the new test to 12,250 feet and will start work at once.

Another important wildcat test is Humble Oil & Refining Company's Tyen 1 in the Pledger area of Brazoria County. It is contracted to 10,000 feet. Exact location is 5½ miles northeast of Pledger townsite on a 242-acre lease in D. Shipman survey. Drilling is scheduled to begin at once.

Extension: A major extension for the Stowell field into Chambers County is looming with Gulf Oil Corporation completing a well 4500 feet northwest of production. The test is Williams 1, and it is now cleaning up for the storage tanks. Perforations were made at two levels, at 7590-7610 feet, 119 shots, and 7640-60 feet, 113 shots. The well started flowing after being swabbed and was flowing 28 percent wash water and the remainder oil through a ¼-inch choke on the bottom sand and 9/32-inch choke on the top section.

Besides being a major extension, the well is the first to extend over into Chambers County. It probably adds thousands of acres of land to production which probably will be drilled immediately. Total depth is 7841 feet with 5½-inch casing cemented at 7768 feet. The well is on lot 85, Koch subdivision, F. Valmore survey.

Austin County: Pan American Production Company is still making flow tests in Austin College 1, Wilcox wildcat test on the southwest flank of Raccoon Bend field. Last perforations were made at 7520-35 feet. Other tests have been made but were not satisfactory. Total depth is 9515 feet with 5½-inch set to 7685 feet.

South Louisiana

Discovery at Arnaudville Improves on Higher Test

Amerada Petroleum Corporation is retesting its recent discovery in the Arnaudville area of St. Martin Parish. Bertinot-Quebedeaux 1, Section 44-7s-5e, flowed 35 barrels of 42.2-gravity oil in 23 hours through 5/32-inch choke, tubing pressure mounting to 4700 pounds.

Previously, the well was tested at 10,386-90 feet and flowed 18 barrels of oil and 154 barrels of salt water in 24 hours through 5/32-inch choke. Total depth is 10,700 feet with 5½-inch casing set to 10,445 feet. This discovery is in extreme north part of the parish.

Extension: Pure Oil Company has completed a southwest extension to the Gueydan field with Alliance Trust 14, Section 33-11s-1w, Vermilion Parish. Perforated at 9708-22 feet and 9730-46 feet, flowing 244 barrels of 35.7-gravity oil through 9/64-inch choke with 300,000 cubic feet of gas daily, tubing pressure mounting to 1675 pounds, casing sealed. Total depth is 10,075 feet with 5½-inch casing set on bottom.

Bayou Couba: Gulf Refining Company has completed the best well so far drilled in the Bayou Couba field of St. Charles Parish, where activity has been at a standstill for several months. The company's Delta Securities 12, Section 18-15s-22e, was perforated at 6462-72 feet and flowed 176 barrels per day through 9/64-inch choke, tubing pressure 1000 pounds. Previously, the well showed all salt water on a test slightly below this level. The hole is bottomed at 7900 feet in salt.

Wildcats: Humble Oil & Refining Company is spudding Rathborne 1, Section 25-7s-7e, a deep wildcat in the Ponchatoula area of Tangipahoa Parish, an area that has seen comparatively little drilling.

The same company is moving rig to

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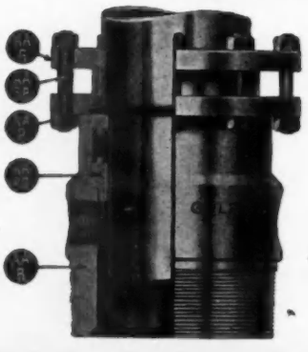

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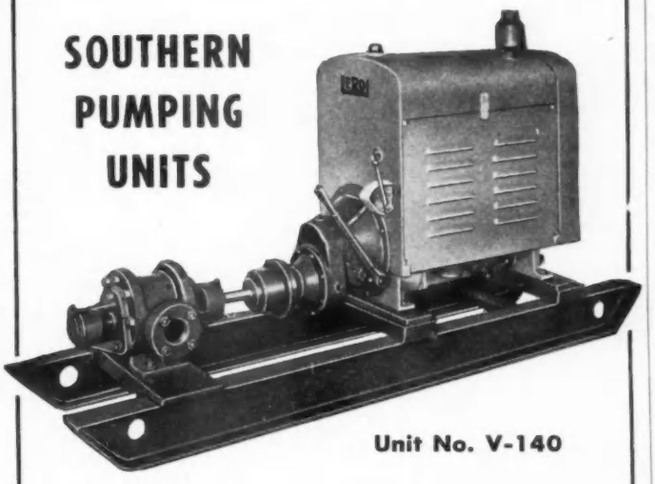

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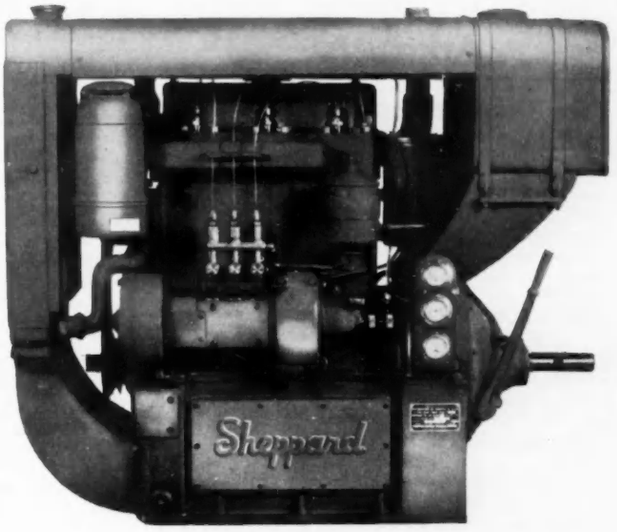

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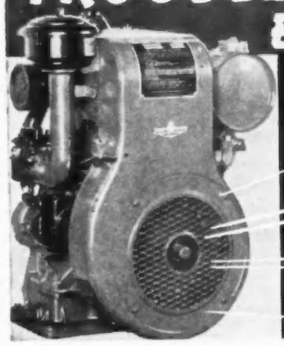

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drill LaTerre Land 2, Section 81-18s-18e, in the South Houma area of Terrebonne Parish, a wildcat projected to 11,500 feet, using company rig.

Continental Oil Company is rigging up Shoesmith 1, proposed 9500-foot wildcat in China area of Jeff Davis Parish, 8 miles north of Roanoke field, in Section 1-8s-4w.

Development: Southwestern Oil Refining Company has staked location for a second well in the Rosedale area of Iberville Parish, recently opened by Sugarfield Oil Company. The test is Schwing 1, Section 62-7s-9e, 1¼ miles west of the discovery. Markley-Bankhead is the drilling contractor with the test to be drilled to 12,000 feet.

Arkansas

Two Completions; Two Wildcat Tests Announced

Two completions in widely scattered Arkansas fields were recorded this week, two new wildcat operations were announced, and several wells were at the testing and completion stage, with some expected to flow and others to be placed on pump. First production figures became available on Harold Wright's J. W. Cox 1, NE SE 8-17-18, opening new production in the Mt. Holly area, and on the Kerlyn Oil Company well two miles from production in the old Rainbow City field of Union County.

Chicot County: H. L. Hunt's Meyer 1, SE NE 3-19-1, was abandoned at 7210 feet after testing failed to make a commercial well.

Ouachita County: Announcement was made of a lime test by the Phillips Petroleum Company in the old Smackover field, Section 33-15-15. It will be drilled to 4500 feet and all sands will be cored, available information to be turned over to the Arkansas Oil and Gas Commission for its secondary-recovery program survey.

Stephens County: One outside well was temporarily abandoned in the Smart field, but is to be deepened in search of production in the lime. The only completions were in the Smart field, with initial production on one reported at 200 barrels daily, and on the other at 150 barrels per day.

Union County: There was a showing of oil in the Cotton Valley of Phillips Petroleum Company's wildcat Andrews 1, south of the Urbana field. Preparations were being made to move in a heavier rig to take the hole down to the lime.

Michigan

Lake County Wildcat Indicated Pool Opener

J. C. Glavin's Wilder 1, W½ SW SW 35-19n-11w, Ellsworth Township, Lake County, wildcat three miles northwest Reed City pool, logged Traverse lime at 2966 feet and carried good oil saturation, gas and water from 2999 to 3003 feet. Operators decided to drill ahead to the Dundee-Monroe objective but the test now is being closely watched as a possible pool opener.

Gratiot County: Weller and Caldwell's Davidson 1, N½ NW SW 36-11n-3w, completed in Stray sand at 911 feet for 16,600,000 feet of gas, one of the best shallow gas discoveries reported in Michican this year. Operators will skid 1320 feet north and start a second test to the Dundee, 3000-3500 feet, for oil, using rotary rig to penetrate the gas sand.

Proration: P. J. Hoffmaster, state conservation director, ordered a cut in Reed City well allowables effective December 16 after the State Oil Advisory Board had voted to retain the present schedules and operators had unanimously opposed reductions.

The new order will reduce the field allowable by about 3500 barrels per day to a figure of around 16,000 to 17,000 barrels by reducing 20-acre unit wells to 100 barrels per day from 125 and 40-acre units down to 175 per day.

G. G. Brown and Donald Katz, University of Michigan engineers, who had been asked to study the engineering in the field in connection with the geological survey, recommended cutting the base 20-acre allowable to 80 barrels per day or a field cut from 20,000 to 13,000. Brown said the cut was necessary to stabilize reservoir pressure as a means of assuring maximum recovery.

At public hearings two weeks ago the Brown-Katz recommendation was vigorously opposed by operators in the field. Opposition ranged from contesting the engineering theory on this particular field to the claim that any good would be more than offset by the creation of added problems in materials and manpower. The fact also was stressed that the reduction would seriously affect the supply problem for Michigan refineries dependent on crude from the state.

It marked the first time since the 1939 oil control act was made a law that the director had choosen to "go over the head" of the advisory board. Brown had contended that the slower withdrawal would be compensated for in higher prices for crude produced at a later date and that the recovery might be increased as much as 10 percent or some 7,000,000 barrels.

It too was the first time that engineers outside of the conservation department staff and the industry had been called on to make a report on a major proration matter.

Reaction from producers when the order was issued, five days following the board's vote not to make a change, hinted that a joint appeal may be made direct to the conservation commission appeal board under the terms of the oil act.

Florida

Second Test Starting Near State's Discovery Well

Humble Oil & Refining Company finally has completed Gulf Coast Realties 1, Section 29-48s-30e, Collier County, pumping approximately 550 barrels of fluid daily, 35 percent being oil and the remainder basic sediment and water.

This, the state's initial oil well, drilled to 11,630 feet in lime and set 7-inch casing to 11,598 feet. Perforations were made at 11,343-46 feet and squeezed.

The company is rigging Gulf Coast Realties 2, SW SE 30-48s-30e, 1 mile west of the discovery. Fuel from the discovery will be used to drill the second test.

Geology Review Issued By Colorado Mines

The Department of Publications of the Colorado School of Mines, Golden, announces publication of the "Review of Petroleum Geology in 1942" as Volume 38, Number 3 of the Quarterly of the Colorado School of Mines. The Review is the work of Dr. F. M. Van Tuyl, head of the department of geology, with the cooperation of members of the staffs of the departments of geology, geophysics, and petroleum engineering at the Colorado School of Mines.

The work comprises 75 pages and includes a list of 209 references to publications of the year. Included are noteworthy events and developments in the fields of geology, geophysics, geochemistry, geobiology, petroleum engineering, and aerial photography.

The work was compiled through the cooperation of the research committee of the American Association of Petroleum Geologists and was presented in part at the 1943 annual convention of the association at Fort Worth.

The editor of the Quarterly has announced that the review of the preceding year will be published annually as the April number of the Quarterly.

The present "Review" may be obtained from the Department of Publications, Colorado School of Mines, Golden, Colorado, at $1.00 postpaid.

Producing Ability

■ CONTINUED FROM PAGE 25

tember production, but 12,525 barrels under its November output.

Mississippi in September and November was shown to be producing 12,423 and 13,658 barrels, respectively, over its efficient rate.

New Mexico was given a producing ability of 101,884 barrels, which was 10,609 barrels under its September production and 10,816 barrels under its November production.

In arriving at its conclusions, neither the types of the crudes necessary for the war effort, nor the adequacy of field tankage and pipe line capacities that would necessarily be involved in making the volumes indicated available for refinery utilization, were considered by the committee. The report, therefore, is strictly an estimate of the ability to produce and not of the availability or desirability of the crudes.

The committee's determinations represent average rates or sustainable rates for the six-month period ending June 30, 1944. Subsequent considerations will necessitate revisions of the present estimates as additional data concerning subsequent completions, abandonments, and reservoir performance are obtained.

John S. Ivy of Houston is chairman of the Subcommittee on Reserves and Development that made the study. Other members were: D. V. Carter, Perry Olcott, Alexander Deussen, E. P. Hayes, H. B. Fuqua, and A. L. Selig.

United States Well Completions

ARIZONA

Maricopa County: John A. Robertson et al's Robertson 1, c ne ne 33-5n-3w, dr with hfw at 1950 ft.

ARKANSAS

Chicot County: H. L. Hunt's Meyers 1, se ne sec 3-19-1e, dry, abnd 7210 ft.

Columbia County: Harold Wright's W. J. Cox 1, 8-17-18, 297 bbls 41-gr oil, 133,650 gas.

Columbia County—Magnolia: Hollyfield and Macfarlane's Rowe 1, sw sw 16-17-20, 136 bbls 41-gr oil, 340,000 gas, td 5778 ft.

Miller County: Carter Oil Co.'s Lesser Gold 2, sw se 31-16-26, 10 bbls per hr, 15% salt wtr, td 3445 ft.

Stephens County—Smart Field: R. H. Crow, Tr.'s W. T. Guttry C-2, se se sw 12-15-20, 150 bbls, td 2544 ft.

Durbin Bond's Westley A-2, c sw nw sw 7-15-19, 200 bbls.

Curtis Kinard's J. D. Hall 1, c se se 31-15-19, tem abnd 3647 ft. (To be drilled deeper in search of lime.)

Union County: Kerlyn Oil Co.'s Union Saw Mill Co. 1, 9-17-13, pump 300 bbls.

CALIFORNIA

Fresno County—Coalinga: Standard's Sonntag 11, sw ne nw 36-19-15, pump 99 bbls 20-gr oil, 8 wtr, 101 ft perf 4086 ft, td 4340 ft, pb 4090 ft.

Fresno County—Pleasant Valley: R. S. Lytle, Operator's 3-28F, nw sw nw 28-20-16, flow 508 bbls 29.3-gr oil, 330,000 gas, 15/64-in, 1275/1200 lbs, 152 ft perf 9150 ft, top oil zone 8980 ft, td 9150 ft.

Kern County—Belridge, South: Belridge Oil Co.'s 77A-29, nw se se 29-28-21, pump 15 bbls, perf 284-700 ft. td 2059 ft, pb 700 ft.

Belridge Oil Co.'s 42A-34, se ne nw 34-28-21, pump 35 bbls, perf 624-785, 894-1270 ft, td 1270 ft.

General Petroleum Corp.'s 41-2, se nw ne 2-29-21, pump 47 bbls 14.6-gr oil, 13 wtr, perf 619-701, 872-930, 980-1074 ft, td 1075 ft.

Shell's FKL 10, sw sw se 1-29-21, pump 68 bbls 13.4-gr oil, 29 wtr, perf 1148-1127, 1101-1086, 1079-919 ft, 1148 ft, td 1150 ft.

Shell's TWA 10, ne nw sw 1-29-21, pump 50 bbls 13.5-gr oil, 20 wtr, perf 936-1013, 1050-1118, 1140-1165 ft, td 1175 ft.

Kern County—Cymric: Honolulu Oil Corp.'s Fitzgerald 72-26, sw ne ne 26-29-21, pump 40 bbls 11.9-gr oil, 7 wtr, 92 ft perf 1455 ft, td 1456 ft.

Kern County—Edison: Wood-Callahan Oil Co.'s Bloemer 1, ne nw se 21-30-20, pump no est, 55 ft perf 3873 ft, td 3873 ft.

Kern County—Kern Front: Standard's 50, ne sw se 15-28-27, pump 59 bbls 13.2-gr oil, 23 wtr, 243 ft perf 2275 ft, td 2280 ft.

Kern County — Midway-Sunset: Standard's 109-19D, ne sw ne 19-32-24, pump 12 bbls 19.1-gr oil, 4 wtr, 43 ft perf 3028 ft, td 3624 ft, pb 3030 ft.

Standard's 35-11D, nw nw ne 35-32-24, pump 69 bbls 27.1-gr, perf 2985-3065 ft, 3095 ft, td 3100 ft.

Texas Co.'s 25-5, se nw nw 25-31-22, pump 10 bbls oil, 2 wtr, 237 ft perf 2612 ft, td 2613 ft.

Kern County—Mount Poso: Ring Oil Co.'s Bowles 29-30, ne sw sw 29-26-28, pump 60 bbls 15.5-gr, 25 ft perf 1735 ft, td 1739 ft.

Ring Oil Co.'s Bowles 29-31, ne sw sw 29-26-28, pump no est, 25 ft perf 1738 ft, td 1738 ft.

Ring Oil Co.'s Bowles 29-32, se sw sw 29-26-28, pump no est, 22 ft perf 1770 ft, td 1770 ft.

Kern County—Poso Creek: Pacific Western Oil Corp.'s Enas Fee 26A, se nw sw 21-27-27, pump 56 bbls oil, 6 wtr, 47 ft perf 2090 ft, td 2090 ft.

Kern County—Round Mountain: Crestmont Oil Co.'s Staley 15, sw se se 8-28-29, pump 120 bbls 17.1-gr, 52 ft perf 1707 ft, td 1707 ft.

Kern County—Strand: Tide Water's KCL 58-8, sw sw se 8-30-26, Stevens sand unproductive, abnd 8262 ft.

Los Angeles County—Montebello: Standard's Balwin 110, ne se ne 1-2-12, pump 110 bbls 19-gr oil, 12 wtr, 593 ft perf 2653 ft, td 2657 ft.

Los Angeles County — Wilmington: Long Beach Oil Development Co.'s "W" 60, 595 nely alng n/l Seaside Blvd fr e side 27th Ave thence 1384 ft sely at r/a, pump 313 bbls 18.3-gr oil, 73,000 gas, perf 3091-3439 ft, td 3510 ft, pb 3449 ft.

Orange County—Huntington Beach: Holly Oil Co.'s 9, ne se sw 35-5-11, pump 50 bbls 16.2-gr oil, 10 wtr, 36 ft perf 3820 ft, td 3820 ft.

Southwest Exploration Co.'s State J-1, 363 ft w alng proj c/l Ocean fr c/l 23rd St thence 123 ft n at r/a, flow 214 bbls 20-gr, 14/64-in, 310/1000 lbs.

Standard's Huntington E-11, 1194 ft sely alng c/l Wesley Ave fr c/l 23rd St thence 580 ft swly at r/a, pump no est, 111 ft perf 2279 ft, td 2695 ft, pb 2281 ft.

Santa Barbara County—Cat Canyon: Union's Bell 19, 3630 ft sly, 990 ft wly fr nec Bell ppty 36-9-33, flow 431 bbls 17.4-gr oil, 119,000 gas, 23/64-in, 140/100 lbs, 682 ft perf 5685 ft, td 5687 ft.

Ventura County—Ventura Avenue: General Petroleum Corp.'s Barnard 26, 240 ft s, 415 ft w C. L. No. 11, 28-3-23, flow 197 bbls 23-gr oil, 120 wtr, 40/64-in, 70/775 lbs, td 8958 ft, pb 8861 ft.

Lloyd Corp.'s L. C. 11, 1055 ft n, 9459 ft e, R. C. L. No. 11, flow 1265 bbls 33-gr oil, 1,568,000 gas, 48/64-in, 300/500 lbs, 171 ft perf 8505 ft, td 8505 ft.

Shell's Taylor 167, 322 ft s, 7910 ft w, R. C. L. No. 11, flow 1017 bbls 28.7-gr oil, 415 wtr, 400,000 gas, 40/64-in, 375/0 lbs, perf 8757-8560, 8497-8437, 8394-7613, 7570-7376, 7334-7170 ft, td 8861 ft, pb 8760 ft.

CALIFORNIA WILDCATS

Fresno County—Failure: Wilshire Oil Co.'s Imperial 1, sw se se 34-18-15, Coalinga, North area, Kreyenhagen 2235 ft, abnd 2250 ft.

Kern County—Failure: Chanslor Canfield Midway Oil Co.'s 26, se se ne 1-32-22, Midway area, at 2770-2870 muddy water, abnd 3052 ft.

Kern County—Failure: Dwight G. Vedder's Glide 29-3, sw sw sw 29-27-28, Mount Poso area, barren Vedder sand 2379 ft, abnd 2397 ft.

Kern County—Failure: Union's Kernco 81-8, ne ne ne 8-29-25, Rio Bravo area, 5818-5853 ft mud, salt water, some gas, deeper zones barren, abnd 10,165 ft.

Kern County—Failure: Ring Oil Co.'s Vedder 4, 700 ft n, 1320 ft w, sec 28-26-28, Mount Poso area, Vedder 1395 ft, abnd 1420 ft.

Monterey County—Failure: Royalty Service Corp.'s Federal 1, se se ne 21-24-10, Bradley area gas test, wet, abnd 7673 ft.

Sacramento County — Failure: Amerada's Gwerder 1, ne nw se 36-5-5, Thornton area gas test, tested 3380-90 ft, abnd 3799 ft.

San Joaquin County—Failure: Standard's Blewett Comm. 3, sw sw sw 23-3-6, Vernalis area gas test, form. test 5164-5237 muddy water, no gas, abnd 5257 ft.

Sutter County — Failure: Shell's Buttes Comm. C-1, se se ne 12-16-1, Marysville Buttes area gas test, form. test 4942-6000 ft, muddy water, abnd 6565 ft.

Tulare County — Failure: Richfield's Hastings 1, se se sw 28-22-17, Terra Bella area, slate, abnd 1741 ft.

ILLINOIS

Clay County: W. C. McBride's A. H. Neeley 2, se ne se 3-3n-7e, Cyp 2582-2600 ft, 48 bbls, 2609 ft.

W. C. McBride's Patton 1, se nw nw 11-3n-7e, Cyp 2595-99 ft, 2600-2608 ft, 48 bbls, 2615 ft.

Cole County: Lario O & G's S. B. Scotoo et al 1, se sw ne 25-12n-7e, abnd 2153 ft.

Edwards County: Bennett Bros.' A. G. Smith 1, nw ne 11-1n-14w, L O'H 2839-51 ft, 101 bbls, 2857 ft.

Texas Co.'s G. C. Densmore 1, sw ne nw 35-2n-10e, McCl 3244-50 ft, 5 bbls, 3250 ft.

Effingham County: P. D. Lynch's Bovaird 2, se ne nw 34-6n-5e, Ben 2296-2307 ft, 25 bbls, 2318 ft.

Jarvis & Marcell's Shirley 1, nw nw sw 35-6n-5e, McCl 2438-42 ft, 112 bbls, 2471 ft.

Magnolia's M. Norris 1, nw nw 16-6n-6e, McCl 2564-73 ft, 17 bbls, 2582 ft.

Franklin County: J. W. Menhall's Valier Coal Co. 1, ne se sw 7-6s-2e, abnd 2858 ft.

Hamilton County: Texas Co.'s J. C. Hall "B" 14, sw sw nw 17-6s-7e, TS 2376-89 ft, 50 bbls, 2397 ft.

Marion County: Texas Co.'s S. Parker 16, ne se ne 33-2n-2e, Ben 1850-63 ft, 1865-71 ft, 37 bbls, 1886 ft.

Highland Oil Co.'s R. J. Stephens 1, sw se nw 35-4n-1e, Weiler 1367-73 ft, 5 bbls, 1373 ft.

Montgomery County: Carl & K. D. K. Kiester's L. Moore 3, se se se 12-10n-5w, abnd 625 ft.

Wabash County: Olds Oil Co.'s H. Baremgart 1, se sw sw 5-1s-12w, Cyp 2008-21 ft, 75 bbls, 2072 ft.

Texas Co.'s C. Kuhn 4, se nw sw 8-1s-12w, Weiler 2019-34 ft, 26 bbls, 2036 ft.

Superior's E & C Crow Unit 14, nw se nw 9-1s-12w, Biehl 1488-1512 ft, Cyp 2045-60 ft, 180 bbls, 2062 ft.

M & P Oil Co.'s G. S. Couch 7, ne nw nw 16-1s-12w, McCl 2316-22 ft, 35 bbls, 2322 ft.

Wayne County: Deep Rock's Clyde Young 1, sw ne 32-1s-7e, McCl 3278-82 ft, 129 bbls, 3292 ft.

R. B. Martin's Huth-Musgraves Comm. 1, se se 25-2s-7e, abnd 3548 ft.

Texas Co.'s E. Koontz 5, sw se sw 33-2s-7e, AV 3193-3204 ft, 137 bbls, 3205 ft.

Texas Co.'s H. Silverman 8, nw se 16-3s-7e, abnd 3367 ft.

White County: Jack Hinkle's Downen 1, se se sw 2-7s-9e, Penn Sd 1508-18 ft, 23 bbls, 1518 ft.

ILLINOIS WILDCATS

Clinton County—Failure: Harry B. Hoover's

Wells Completed in United States in Week Ended December 11, 1943

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama	....	....	....	....	....	....	....	....	....	....	....	....	2	3
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	5	3
Arkansas	1	....	....	1	2	....	....	....	....	....	2	2	206	224
California	27	....	....	1	28	....	....	....	10	10	38	33	1,381	778
Colorado	....	....	....	....	....	....	....	....	....	....	....	1	24	15
Florida	....	....	....	....	....	....	....	....	....	....	....	....	5	1
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	1	2
Illinois	17	....	....	5	22	....	1	....	4	5	27	....	1,687	2,052
Indiana	3	....	....	....	3	....	....	....	....	....	3	....	254	373
Kansas	22	3	....	5	30	5	1	....	8	9	44	30	1,672	1,548
Kentucky	8	....	....	7	15	....	....	....	5	5	20	....	408	161
Louisiana	3	....	....	2	5	....	....	....	....	....	5	4	531	881
North Louisiana	....	....	....	....	....	....	....	....	....	....	....	....	202	....
South Louisiana	3	....	....	2	5	....	....	....	....	....	5	4	329	....
Michigan	3	....	....	4	7	....	....	2	7	9	16	16	577	642
Mississippi	....	....	....	....	....	....	....	....	....	....	....	....	35	100
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	27	34
Montana	....	....	....	....	....	....	....	....	....	....	....	15	223	193
Nebraska	....	....	....	....	....	....	....	....	....	....	....	....	....	28
New Mexico	1	....	....	....	1	1	1	....	....	1	3	12	260	371
New York	15	....	10	....	25	....	....	....	....	....	25	26	1,192	1,192
Ohio	6	....	....	5	11	....	....	....	....	....	11	9	727	1,085
Oklahoma	17	....	2	1	20	3	3	....	5	8	31	31	1,404	1,372
Pennsylvania	31	9	17	....	57	....	....	....	....	....	57	55	2,632	3,761
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	6	9
Texas	35	3	....	18	56	7	2	1	25	28	91	117	4,117	5,046
E.Tex.Bor. Co.'s	....	....	....	....	....	....	....	....	....	....	....	....	18	....
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	....	5	....
Rest of E. Texas	....	1	....	1	2	....	....	....	5	5	7	9	245	....
North Texas	10	....	....	7	17	....	1	....	7	8	25	31	1,031	....
W. Central Tex.	1	2	....	5	8	1	1	....	4	5	14	8	376	....
West Texas	13	....	....	1	14	6	....	....	2	2	22	26	920	....
Tex. Panhandle	4	....	....	....	4	....	....	....	....	....	4	6	190	....
G. Coast Upper	2	....	....	3	5	....	....	1	....	1	6	13	321	....
G. Coast Lower	3	....	....	1	4	....	....	....	2	2	6	12	597	....
Southwest Texas	2	....	....	....	2	....	....	....	2	2	4	8	349	....
S. Central Tex.	....	....	....	....	....	....	....	....	3	3	3	4	65	....
West Virginia	4	8	....	7	19	....	....	....	....	....	19	26	675	729
Wyoming	....	....	....	....	....	....	....	....	....	....	....	5	116	98
Total U.S.	193	23	29	56	301	16	8	3	64	75	392	382	18,167	20,701

* Includes distillate wells. † Includes salt water disposal wells.

Means 1, nw sw se 26-2n-2w, abnd 1406 ft.

Cumberland County—Failure: Dexter & Gilcrest's L. L. Huisenga 1, ne se 30-9n-9e, abnd 2727 ft.

Franklin County—Discovery: Nash Redwine & Sohio's Eva Taylor 1, se sw nw 21-5s-3e, Cyp sd 2535-44 ft, 199 bbls, 3115 ft.

Franklin County—Failure: Nat'l Associated Pet.'s Cook "B" 1, ne nw ne 4-6s-2e, abnd 2904 ft.

White County—Failure: Seaboard Oil Co.'s Ivan White 1, sw nw se 3-5s-9e, abnd 2748 ft.

INDIANA

Gibson County: Farm Bureau's Edith Clain 1, nw nw nw 21-1s-9w, Traverse sand 1280-88 ft, 30 bbls, 1288 ft.

Superior's E. Thompson Unit 3, se sw ne 25-2s-12w, Cyp 1974-88 ft, 211 bbls, 1988 ft.

Continental's Bozeman Land Co. 65, sw sw sw 24-3s-14w, Walt 2071-2105 ft, 58 bbls, 2105 ft.

KANSAS

Barber County—Sun City: Mid-Continent's Massey 1, c se se 22-30s-15w, Lansing 3900 ft, perf, 2000 gals acid, flow 18 bbls 15 min, td 4449 ft, pb 4430 ft.

Great Lakes Carbon's Freeman "B" 2, nw sw sw 26-30s-15w, Lans 3872 ft, 1000 gals acid, flow 68 bbls 1 hr, 4331 ft.

Barber County—Bear Creek: Great Lakes Carbon's Welsh 1, nw sw se 30-31s-15w, (OWWO) otd 5305 ft, opb 4249 ft, Douglas 4234 ft, shot 10 qts, perf, est pump 12 bbls per hr, re-comp for old potential of pump 85 bbls oil, 25 bbls wtr.

Barton County—Kraft-Prusa: Cities Service's Ney 2, sw se sw 8-16s-11w, perf Lans 3001 ft, Arb 3293 ft, 3000 gals acid, pump 3½ bbls fluid per hr for 20 hrs, 90% wtr, td 3303 ft, pb and abnd 3281 ft.

Butler County—Potwin: Phillips' Houston 3, c sw ne 12-25s-3e, Miss 2648 ft, 1000 gals acid, ns, td 2694 ft, pb and abnd 2675 ft.

Butler County—Eldorado: Cities Service's Pirtle 24, ne ne ne 19-25s-5e, Kinderhook 2584 ft, shot 270 qts, est pump 60 bbls, 2598 ft.

Ellis County—Riverview: Phillips' Hand 1, se sw sw 20-11s-18w, Arb 3616-18 ft, pump 212 bbls, 3626 ft.

Ellsworth County—Stoltenberg: Cities Service's Stoltenberg 1, ne ne se 33-16s-10w, Arb 3269 ft, 2500 gals acid, pump 113 bbls, 3397 ft.

Ellsworth County—Wilkins: Vickers' Grounds 1, c ne sw 12-17s-10w, Arb 3258 ft, 2500 gals acid, pump 25 bbls fluid per hr, 75% wtr, 3283 ft.

Graham County—Morel: Cities Service's Darnell 2, c se nw 22-9s-21w, Arb 3801 ft, fill up 2800 ft oil in 5¾ hrs, no wter, 3805 ft.

Greenwood County—Beaumont: K. T. Weideman's Edgar "B" 1, nw sw ne 2-28s-8e, Miss 2501 ft, 1000 gals acid, est pump 20 bbls, 2515½ ft.

Kearny County—Hugoton Gas Pool—Larkin: Fin-Ker's Kriete 1, c sec 35-24s-35w, Ft. Riley prod, 30,000 gals acid, 18,400,000 gas, 2699 ft.

Marion County—Lost Springs: Bob Youker's Kerry 2, nw sw ne 3-17s-4e, Miss 2276 ft, can't recover tools, pump 380 bbls 24 hrs with fsg tools in hole, 2328 ft.

Cathout et al's Thompson 3, se ne ne 26-17s-4e, Miss Lime 2350 ft, ns, abnd 2385 ft.

Pratt County—Chitwood: Lion O & R's Chitwood 3, ne sw nw 23-28s-12w, Simpson Sh 4363 ft, 2000 gals acid, flow 30 bbls in 30 min, td 4474 ft, pb 4372 ft.

Reno County—N. Hilger: Phillips' Manning 2, sw se nw 34-25s-4w, Viola 4111 ft, pump 369 bbls, 4117 ft.

Phillips' Sheff 1, sw nw nw 34-25s-4w, Viola 4091 ft, pump 300 bbls, 4093 ft.

Skelly's Newby 1, sw nw sw 34-25s-4w, Viola 4094 ft, pump 168 bbls in 8 hrs, td 4096 ft.

Rice County—Chase: Sharon Drlg.'s Maes 2, sw sw sw 14-19s-9w, Arb 3242-47 ft, 1000 gals acid, est pump 120 bbls, 3263 ft.

Rice County—Raymond: Hall & Branine's Warner "A" 2, c w½ nw 15-20s-10w, Lans 3087 ft, Arb 3426 ft, fill 1700 ft wtr, abnd 3450 ft.

Rooks County—Barry: Continental's J. E. Slansky 2, ne se nw 2-9s-19w, Arb 3390-91 ft, fill 2800 ft oil, 3410 ft.

Russell County—Fairport: Liggett Oil's Durham 3, c sw ne 20-11s-15w, Lans 2954 ft, Arb 3315 ft, perf in Lans, 2000 gals acid, pump 35 bbls, td 3333 ft, pb 3108 ft.

Russell County—Williamson: Skelly's Boxberger "D" 2, sw sw se 3-14s-14w, Lans 2981 ft, 1500 gals acid, pump 34 bbls oil, 61 bbls wtr, td 3013 ft, pb 2975 ft.

Russell County—S. Forrest Hill: Helmerich & Payne's Grizzell 2, nw se nw 33-15s-12w, Arb 3345 ft, ns, abnd 3350 ft.

Russell County—Trapp: Sohio's Anschutz 3, sw ne nw 10-15s-13w, Lans 3054 ft, Arb 3348 ft, 3500 gals acid, pump 973 bbls, 3368 ft.

Saline County—Hunter: Deep Rock's R. A. Hunter 2, ne se sw 20-16s-1w, Miss chat 2649 ft, flow 21 bbls, 2651 ft.

Sedgwick County—Shockley: Beech Aircraft's Shockley 1, nw ne sw 32-28s-2e, Stalnaker sd 2216 ft, est 250,000 gas, 2222 ft.

Stafford County—Hazel Pool: Phillips' Krone 1, c sw sw 22-21s-13w, Arb 3668-70 ft, 2500 gals acid, 3673 ft.

Stafford County—Zenith: Transwestern's Krey 3, c nw se 36-23s-11w, Viola 3691 ft, 2000 gals acid, flow 292 bbls in 6 hrs, 3703 ft.

Stevens County—Hugoton: Northern Natural's Albert 1, ne se se 11-33s-37w, Ft. Riley prod, 12,000 gals acid, 27,285,000 gas, 2825 ft.

KANSAS WELLS DEEPENED

Butler County—Brandt-Sensenbaugh: Adair-Morton's Sawyer "B" 1, se ne sw 10-28s-7e, Miss 2729 ft, est pump 50 bbls oil, 30 bbls wtr, otd 2877 ft, td 3138 ft, pb 2740 ft.

McPherson County—Voshell: Sinclair Prairie's Stuckey 2, c e½ se 28-20s-3w, Arb 3461 ft, pump 52 bbls oil, 225 bbls wtr, otd 3420 ft, 3464 ft.

Pratt County—Cairo: Skelly's Levi Harding 1, c sw 7-28s-11w, Simpson 3465 ft, ns, otd 4283 ft, abnd 4406 ft.

Russell County—Fairport: Sohio's Austin 6, se se sw 5-12s-15w, Basal sd 3211 ft, Pay 3211-22 ft, pump 60 bbls, otd 2949 ft, 3222 ft.

Russell County—Trapp: Carter's Meharg 4, nw nw se 18-15s-13w, Granite Wash 3574 ft, 5000 gals acid, otd 3283 ft, 3644 ft.

KANSAS WILDCATS

Barber County—Failure: Auto Ordnance-Phillips' National Gypsum Co. 1, swc nw, 10-31s-15w, Arb 4856 ft, perf 70/4630-45 ft, shot 40 qts 4630-57 ft, 3000 gals acid, bailed 16 gals oil, 25 gals wtr, td 4906 ft, pb and abnd 4645 ft.

Ellis County—Failure: Phillips' Harman 1,

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P. O. Box 2608 Houston 1, Texas

se se se 1-12s-19w, cong 3693 ft, Simp 3772 ft, Arb 3850 ft, Base KC 3625 ft, abnd 3880 ft.

Ellsworth County—Failure: Shell's Brejcha 1, ne se nw 5-17s-10w, Arb 3365 ft, 2½ ft dense dol, ns, abnd 3458 ft.

Graham County—Failure: Bridgeport Oil Co.'s Balthazor 1, nw se se 34-8s-21w, Topeka 3090 ft, Lans 3347 ft, Base KC 3567 ft, cherty cong 3670 ft, Arb 3693 ft, Heebner 3305 ft, Toronto 3327 ft, Base Oread 3338 ft, abnd 3743 ft.

Pratt County—Failure: Mid-Continent's Walsh 1, sw se se 1-27s-12w, Arb 4519 ft, Simp sh 4377 ft Simp dol 4428 ft, Viola 4338 ft, abnd 4570 ft.

Reno County—Failure: Nelson Drlg. Co.'s "S" Bacon 1, nw ne ne 36-23s-5w, Hunton 3744 ft, base Hunton 3826 ft, ns, abnd 3896 ft.

Sedgwick County—Failure: J. M. Dutton's McCormick 1, sw sw nw 23-25s-3w, owdd, otd 4093 ft, dd to 4151 ft in Arb, 1000 gals acid, no oil, perf 3483-3547 ft, abnd 4151 ft.

Stafford County—Discovery: Hershfield et al's Heyen 1, c nw nw 24-22s-12w, Anhy 608 ft, Lans 3350 ft, Viola 3562 ft, Simp 3585 ft, Arb 3649 ft, sso in Arb 3654 ft, fu 2000 ft oil in 2 hrs, swab 120 bo in 15 hrs, 750 gals acid, 2506 ft wtr, 287 ft oil in hole, td 3654 ft.

Stafford County—Failure: Fraco Central & Hinkel's Freymiller 1, c sw sw 31-25s-11w, Lans 3565 ft, sso 3700-20 ft, sso 3749-52 ft, Simp sd 4185 ft, Arb 4252 ft abnd 4288 ft.

KENTUCKY

Butler County: Carl Burger's Robert Ward 1, 8-H-32, Hds 451-75 ft, 10 bbls, 477 ft.

Daviess County: Pet. Co. and Ellis' M. Leet 2, 16-N-29, abnd 1720 ft.

South Penn's J. S. Wedding 1, 1-N-31, abnd 982 ft.

South Penn's E. C. Ward 11, 1-N-31, TS 625-47 ft, 2 bbls, 650 ft.

Hancock County: Greer & Kimmell's T. Huff 1 (5), 12-O-33, abnd 605 ft.

Henderson County: Sinclair Prairie's Chandler 2, 3-N-23, Walt 1813-27 ft, Hds 2040-48 ft, 50 bbls, 2052 ft.

Bennett Bros.' A. Walker 5, 10-N-24, Penn sd 800-11 ft, 8 bbls, 811 ft.

Cherry & Kidd's Mrs. Heft 1, 14-N-24, TS 1800-1870 ft, 240 bbls, 1870 ft.

Sohio's B. C. Barthley 1, 17-P-23, abnd 2792 ft.

Walter Sargent et al's Wm. Gregory 2 (3), 20-P-27, Pal 1037-54 ft, 8 bbls, 1057 ft.

Ohio County: Ellis Massey's C. O. Martin 3, 3-M-31, abnd 820 ft.

Tom Galey et al's Renfrow Heirs 1 (4), 14-M-33, abnd 377 ft.

Union County: Trans Tex.'s Newman 2, 13-O-19, Penn sd 1423-35 ft, 59 bbls, 1442 ft.

Hiawatha's City of Uniontown 4, 19-P-19, Pal 1579-93 ft, 70 bbls, 1593 ft.

Webster County: Texas Co.'s J. Townsend 1, 23-M-21, abnd 1218 ft.

KENTUCKY WILDCATS

Allatin County — Failure: Gulf's George Brown 1, 7-V-74, abnd 817 ft.

Daviess County—Failure: Bennett Bros. & A. C. Thomas' Mrs. H. Howard 1, 20-P-32, abnd 1070 ft.

Hancock County—Failure: Kentucky Nat. Gas Co.'s Anna Conner 1, 17-P-33, abnd 776 ft.

Pendleton County—Failure: Gulf's R. Logan 1, 21-W-74, abnd 709 ft.

Webster County—Failure: B. B. Hamilton et al's A. B. Vaughn 1, 24-L-20, abnd 1867 ft.

SOUTH LOUISIANA

Acadia Parish—North Richie: Continental's Acadia Parish School Board 3, 3128 ft n & 2089 ft w of se cor sec 16-7s-1w, abnd 8605 ft.

Acadia Parish—Estherwood: Sun & Continental's Homeseekers Development 2, 2155 ft n & 464 ft e of sw cor sec 54-10s-1w, abnd 11,962 ft.

Calcasieu Parish—Vinton: Union Oil Company's Gray 1-B, 330 ft s&w of ctr of nw¼ sec 33-10s-12w, 5½-in 5850 ft, perf 5808-40 ft, flow 194 bbls, 1/8-in, td 5850 ft.

St. Charles Parish—Bayou Couba: Gulf's Delta Securities 12, 3320 ft s on wl sec 18 fr nw cor & 1996 ft e at ra in sec 18-15s-22e, 5½-in thru pay, perf 6462-72 ft, flow 176 bbls, 9/64-in, td 7899 ft.

Vermilion Parish—Gueydan: Pure's Alliance Trust 14, sw flank, 1215 ft n & 1318 ft w of se cor sec 33-11s-1w, 5½-in 10,075 ft, perf 9708-22 ft, 9730-46 ft, flow 244 bbls, 9/64-in, td 10,075 ft.

MICHIGAN

Clare County — Hatton: C. W. Teater's Ranch 2, se nw sw 31-18n-4w, Dundee lime, dry, td 3963 ft.

Mecosta County—Fork: Sun's Murray 9, s½ se ne 5-16n-7w, Dundee lime, pump 35 bbls, td 3847 ft.

Gordon Oil Co.'s Meier 2, s½ sw se 7-16n-7w, Dundee lime, flow 162 bbls 19 hrs, td 3901 ft.

Osceola County—Cedar: Sun's State A1, s½ nw ne 28-18n-9w, Dundee lime, dry, td 3932 ft.

Osceola County—Evart: Sun's Fent-White 1, n½ nw nw 25-18n-8w, dry, td 3810 ft.

Van Buren County—North Bangor: Fisher-McCall's Salvane 2, se sw nw 9-2s-16w, Traverse, flow 165 bbls, td 1015 ft.

Van Buren County—East Bangor: Harris Oil Co.'s Watkins 2, se nw sw 14-2s-16w, Traverse lime, dry, td 1045 ft.

Van Buren County—New Geneva: Michahoma Oil Co.'s Empson 1, nw nw nw 25-1s-16w, Traverse, pump 40 bbls, td 1029 ft.

MICHIGAN WILDCATS

Allegan County—Failure: Rex Oil & Gas Co.'s Spoelstra 1, se se se 4-4n-11w, Traverse lime, dry, td 2026 ft.

Clare County—Failure: Sun's Van Deusen 1, n½ nw nw 14-20n-4w, Marshall 1562 ft, td 1580 ft.

Gratiot County—Ithaca Gas Field Discovery: Weller and Caldwell's Davidson 1, n½ nw sw, 36-11n-3w, elev 765 ft, Stray sand 880 ft, pay 886-901, 903-911, gauged 16,600,000 ft, td 911 ft.

Kent County—Failure: James J. McGerry's Whittal 1, se se nw 26-9n-10w, Traverse, td 3006 ft.

Lake County—Failure: C. W. Teater's Heyd 1, n½ ne ne 35-20n-11w, Dundee 3604 ft, td 3797 ft.

Mecosta County—Failure: Gordon Oil Co.'s Detwiler 1, e½ nw sw 13-16n-8w, Dundee 3876 ft, td 3890 ft.

Osceola County—West Evart Gas Field Discovery: Taggart Bros. Co.'s WE 1, c nw 29-18n-8w, Stray sand 1463 ft, gauged 1,000,000 ft, td 1491 ft.

Sanilac County—Failure: L. G. Thompson's Hirsch 1, e½ se se 14-13n-12e, Dundee 2312 ft, td 2496 ft.

Van Buren County—Failure: S. L. McCall's Griffith 1, sw sw ne 17-1s-15w, Traverse lime, td 1133 ft.

NEW MEXICO

Eddy County: Emperor Oil Co.'s Puckett 7-B, c nw ne 25-17s-31e, flow 617 bbls, 2-in, shot 200 qts 3850-3916 ft, td 3940 ft.

NEW MEXICO WELL DEEPENED

Lea County — Maljamar: Maljamar O & G Corp.'s Mitchell 10-B, c se se 19-17s-32e, otd 3840 ft, flow 245 bbls, 2-in, pay 3935-68 ft.

NEW MEXICO WILDCAT

Lea County—Discovery: Skelly's University 1-U, c ne ne 5-22s-35e, elev 3623 ft, top anhydrite 1840 ft, salt 1990-3625 ft, Yates 3835 ft, pump 122 bbls 37.4-gr oil, 3 bbls wtr,

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shot 200 qts 4025-4126 ft, td 4183 ft, pb 4138 ft.

OKLAHOMA

Creek County—SE Stroud: Crosbie's Elle 2, nw ne ne 17-14n-7e, Prue 2836 ft, shot 200 qts, flow 85 bbls, 2918 ft.

Creek County—Cushing: Sinclair Prairie's Wacoche 7, ne sw ne 29-18n-7e, Layton 1348 ft, comp for repressure well, 1452 ft.

Garvin County—Pauls Valley: Texas Co.'s M. G. Cox 2, nw se nw 25-4n-1w, Penn Sd Prod, dual comp, flow 2151 bbls, 1,624,000 gas, Bromide Sd Prod, flow 1957 bbls, 1,248,000 gas, td 4069 ft.

Ohio and Sun's Teter-Adams 2, nw sw sw 30-4n-1e, Bromide Sd 4052 ft, 711,000 gas, flow 483 bbls, 4065 ft.

Pure's Teter 11, nw sw nw 31-4n-1e, Bromide Sd (base Penn) 3869 ft, 2 Bromide 3872 ft, flow 3199 bbls oil, 2,225,000 gas, 3999 ft.

Cities Service's Wimberly "A" 2, nw sw nw 25-4n-1w, Penn Sd 4022 ft, dual packer 4017 ft, flow 232 bbls, Bromide Sd 4067 ft, flow 831 bbls, td 4078, pb 4075.

Pure and Mid-Continent's Campbell Heirs 2, se sw ne 36-4n-1w, Penn sd zone 3907 ft, flow 583 bbls oil, 564,000 gas, 4047 ft.

Hughes County—Horns Corner: Deep Rock's Nealey-Price 1, ne ne sw 21-7n-10e, Cromwell 3928 ft, est 4000 gas, flow 239 bbls 18 hrs, pinched to flow 250 bbls, 3921 ft.

Noble County—Otoe City: Geo. I. Heywood's Frank Loula 1, nw ne sw 21-22n-1e, Avant 3001 ft, abnd 3412 ft.

Oklahoma County—NE Edmond: Harper & Turner's Sherman 2, c nw se 8-14n-2w, Bart 5584 ft, shot 15 qts, flow 22 bbls, 5903 ft.

Oklahoma County—W. Edmond: Dickey's Young 2, c nw nw 32-14n-4w, Hunton 6854 ft, perf, flow 650 bbls 12 hrs, pinched to 300 bbls, 7073 ft.

Ace Gutowsky's Wagner 2, c ne sw 32-14n-4w, Bart 6710 ft, perf, flow 350 bbls, 7005 ft.

Sohio's Young 1, c sw ne 32-14n-4w, Hunton 6780 ft, flow 600 bbls, 7101 ft.

Osage County—Avant: Sinclair Prairie's No. 74, ne se ne 19-23n-12e, Bart 1604 ft, comp for repressure well, 1737 ft.

Osage County—Barnsdall: Barnsdall's No. 7, sw ne se 3-24n-11e, Bart 1707 ft, shot 20 qts, pump 5 bbls, 1738 ft.

Pawnee County—Lauderdale: Sinclair Prairie's Jameson 10, nw ne se 3-20n-8e, Bart 2423 ft, shot 40 qts, pump 3 bbls oil, 25 bbls wtr, 2462 ft.

Payne County—Ingalls: Crosbie's Wyatt 1, c ne sw 25-19n-4e, Misener 3730 ft, td 3776 ft, pb 3773 ft, flow 331 bbls oil, 400,000 gas, 3776 ft.

Pottawatomie County — Macomb: Dearing's Amerada 1, c sw sw 28-8n-3e, Hunton 4670 ft, flow 92 bbls, 4720 ft.

Pottawatomie County—Keokuk: Wood Oil's Lane 1, ne ne se 14-11n-6e, Hunton chert 4226 ft, flow 40 bbls, 4238 ft.

Stephens County—W. Loco: Frank Gouin's Dilley 2, nw nw ne 7-3s-5w, Lime 1050 ft, perf, 2000 gals acid, flow 50 bbls, 1276 ft.

OKLAHOMA WELLS DEEPENED

Caddo County—W. Cement: Ray Stephens' Pohlman 1, ne ne nw 33-6n-10w, Medrano Sd 5932 ft, perf, flow 321 bbls, otd 3536 ft, opb 3413 ft, td 6105 ft.

Creek County—Slick: Wilcox O & G's Johnson 4, sw ne ne 5-14n-10e, Simpson Sd 3238 ft, otd 3243 ft, pb 3239 ft, pump 5 bbls oil, 2 bbls wtr, td 3359 ft.

Grady County — Cement: Ray Stephens' Johnson 1, nw ne nw 18-5n-8w, Sand 5408 ft, sand 5443 ft, pb 5500 ft, 2000 gas, otd 4556 ft, td 5790 ft.

OKLAHOMA WILDCATS

Cleveland County — Discovery: Mid-Continent's Harris 1, ne se sw 29-10n-3w, flow 168 bbls oil, 2950 gas, 10/64-in, 2000 lbs, well drilled self in, td 8800 ft.

Comanche County—Failure: Northern Ordnance's Stephens "C" 1, 28-3n-10w, se nw ne, perf 880-90 ft, 754 ft, 2000 gals acid, td 2455 ft, pb and temp abnd 932 ft, 1000 gals acid 880-900 ft.

Greer County—Discovery: E. K. McLennan's Nelson 1, se se sw, 30-6n-21w, gas sd 625-30 ft, 868,000 gas, 147 lbs, td 771 ft, pb 650 ft.

Hughes County—Failures: Paul McIntyre et al's Brown 1, ne se nw 16-8n-10e, Glc 2719 ft, Wap 3025 ft, Union Valley 3279 ft, Crom 3318 ft, Low Crom 3348 ft, Cd 3283-93 ft, abnd 3369 ft.

Northern Ordnance's Anglin & Stevenson 1, sw ne ne 36-8n-11e, d plug to 4836 ft, hfw, pb 4800 ft, ripped 4680-4715 ft in Viola, est 15,000 gas, acidize 1500 ft, abnd 4836 ft.

Okfuskee County — Discovery: Devonian's Curray 1, se nw se 2-12n-8e, pb 3525 ft, ripped 3488-3500 ft in Dutcher sd, shot 15 qts 3490-3500 ft, Dutcher sd discovery, td 4313 ft, pb 3525 ft, sand 3492-3500 ft, swab 100 bbls, pumped 60 bbls 24-gr, 3525 ft.

Okfuskee County—Failure: Northern Ordnance's Curry 1, se se se 17-12n-8e, Skinner 2620 ft, Bart 3190 ft, Booch 3480 ft, Glc 3580 ft, Wap 3720 ft, Crom 3726 ft, abnd 3770 ft.

Seminole County—Failure: Gulf's Keys 1, ne nw se 9-11n-8e, Miss Caney 3755 ft, SLC 3763-3767 ft, abnd 3767 ft.

WEST TEXAS

Andrews County—Emma: Sinclair Prairie's Cowden 21, 2310 ft nsl 2365 ft ewl T&P 1, blk 44, T-2-N, pump 60 bbls, acid 5000 gals 4170-4260 ft.

Andrews County—Fullerton: T. & P. Coal & Oil Co.'s Jackson 5, c ne se PSL 17, blk A-32, flow 2464 bbls, 2-in, acid 10,000 gals Clear Fork 6750-7260 ft.

Andrews County—Mascho: Mid-Continent's University 2, 1991 ft nsl 660 ft ewl sec 2, blk 10, pump 231 bbls, acid 1000 gals 4511-4615 ft.

Ector County—Goldsmith: Stanolind's Blakeney 2-c, 330 ft ewl 991 ft nsl 14, blk A, flow 152 bbls oil, 11% wtr, 19/64-in, acid 2000 gals 4121-58 ft.

Hockley County—Slaughter: Jerry Hawkins et al's Mallet 53-A, 580 ft out ne cor lab 12, lge 47, Edwards CSL, flow 610 bbls, acid 12,500 gals 4908-89 ft.

Jerry Hawkins et al's Mallet 82-A, 580 ft out nw cor lab 9, lge 47, Edwards CSL, flow 378 bbls, acid 9500 gals 4954-87 ft.

Humble's Coons 12, 4990 ft snl 660 ft wel PSL 11, blk X, flow 1083 bbls, 2½-in, acid 10,000 gals 4965-5070 ft.

Texas Co.'s Mallet 9-C, 580 ft out nw cor lab 18, lge 51, Scurry CSL, flow 1033 bbls, acid 10,000 gals 5025-46 ft.

T. P. Coal & Oil Co.'s Rains 8, 560 ft snl 630 ft ewl lab 4, lge 42, Rains CSL, flow 801 bbls, 2-in, acid 10,000 gals 4863-4907 ft.

Mitchell County — Westbrook: Anderson-Prichard Oil Corp.'s Morrison 2-A, 1652 ft snl 330 ft wel T&P 32, blk 28, T-1-N, pump 76 bbls, shot 810 qts 2853-3145 ft.

Col-Tex Ref. Co.'s Abrams-T. P. Land Trust 4, 1650 ft snl 1657 ft wel T&P 41, blk 28, T-1-N, pump 84 bbls, 5 bbls wtr, shot 1020 qts 2810-3175 ft.

Mitchell County—Iatan-East Howard: Magnolia's Foster 15, c nw sw T&P 8, blk 29, T-1-S, pump 207 bbls, acid Clear Fork with 2000 gals, shot 420 qts 2625-2840 ft, td 2870 ft.

Pecos County — Lehn: Childress Royalty Co.'s O'Neill 1, 660 ft fr sel and swl H&GN 74, blk 10, abnd 2033 ft.

Pecos County: White & Baker: Cardinal Oil Co.'s White-Baker 3-D, 2351 ft nsl 2310 ft ewl T. C. Ry. 37, blk Z, pump 28 bbls, 15% wtr, shot 60 qts 1635-55 ft, td 1700 ft, pb 1670 ft.

WEST TEXAS WELLS DEEPENED

Upton County—McCamey: Shell's Bowen 1, 4070 ft nsl 330 ft ewl GC&SF Ry. sec 6, otd 2133 ft, pump 36 bbls oil, 27 bbls wtr, acid 1000 gals, td 2235 ft.

Ward County: Rio Bravo Oil Co.'s Olcott 9, 990 ft fr nel 1650 ft fr nwl H&TC 7, blk 34, otd 2536 ft, abnd 3253 ft.

Winkler County—Kermit: Rosley Oil Co.'s McCutcheon-Conoco 6-A, 990 ft out sw cor lse, PSL 16, blk B-3, otd 3000 ft, swab 13 bbls, shot 128 qts 3050-3130 ft, td 3222 ft.

Winkler County—Keystone: W. J. Gourley et al's Jenkins-Conoco 7, PSL 12, blk 77, otd 3428 ft, flow 34 bbls, 12/64-in, shot 260 qts 3430-3502 ft.

WEST TEXAS WILDCATS

Andrews County — Failure: Skelly's University 1-B, c nw ne sec 28, blk 1, elev 3139 ft, top anhydrite 1830 ft, Yates sand 3070 ft, brown lime 4240 ft, solid lime 4570 ft, top black shale 6505 ft, top gray lime 8247 ft, abnd 8437 ft.

Concho County—Failure: B. A. Duffy et al's Wilson 1, c nw nw H&TC 76, blk 8, elev 2309 ft, abnd 3897 ft.

Crockett County — Failure: Duquesne Oil Corp.'s Shannon 1, c nw nw E. L. Ry. 11, blk BB, elev 2703 ft, top anhydrite 1511 ft, abnd 2701 ft.

WEST TEXAS WILDCATS DEEPENED

Crockett County—Failure: John I. & P. D. Moore's Shannon 1-32, c se sw GC&SF 32, blk 1, otd 1892 ft, elev 2514 ft, abnd 2617 ft.

Borden County — Failure: Coffield-Guthrie et al's Conrad 1, c nw L. N. Co. 79, blk 20, otd 3874 ft, elev 2321 ft, top anhydrite 820 ft, San Andres 2080 ft, abnd 4392 ft.

WEST CENTRAL TEXAS

Brown County: J. E. Whitesides et al's Thomason 1, 500 ft snl 900 ft wel blk 24, Jacob Duckworth sur No. 56, abnd 1910 ft.

Eastland County: Hickok P&D Co's Hart 1, 458 ft nsl, 1433 ft ewl H&TC 66, blk 4, 2,000,000 gas, shot 15 qts 3420-30 ft, td 3448 ft.

Palo Pinto County: Hickok P&D Co.-Harry Reynolds' Gauldin 6, 1320 ft snl 305 ft ewl, S. L. Elder sur No. 1742, jkd and abnd 4580 ft.

Shackelford County: Camball Oil Co.'s Pitzer 1, 525 ft fr w cor sec 398 and on common lines of sec 398 and 509, TE&L Co. sur, abnd 605 ft.

Lee & Keys' Diller 19, 100 ft snl 850 ft wel n½ nw HT&B Ry. 2, A-1821, pump 5 bbls, 521-35 ft.

Roeser-Pendleton & Continental's Cook 12-A-118, 345 ft snl 339 ft wel se E. T. Ry. sec 118, 7,722,000 gas, sand 1660-71 ft.

Stephens County: Frank Buttram et al's R. C. Ritchie 1, 467 ft out ne cor nw TE&L sec 1293, elev 1157 ft, Bend 3270 ft, abnd 3306 ft.

Stephens County—Corbett Ranch: Ben F. Read, tr's Corbett 2, 660 ft out ne cor TE&L Co. sec 1062, elev 1202 ft, Bend 3379 ft, Marble Falls 3919 ft, abnd 4175 ft.

Ben F. Read, tr's Corbett 3, 660 ft out sw cor TE&L Co. sec 1091, elev 1206 ft, Bend 3367 ft, Marble Falls 3918 ft, abnd 4143 ft.

WEST CENTRAL TEXAS WILDCATS

Bosque County — Failure: J. J. MacLackland's Stinebough 2, Sebastian Klepport sur A-448, abnd 631 ft.

Jones County—Discovery: Great Lakes Carbon Corp's O. H. Hardy 1, 660 ft out se cor H&TC Ry. 11, Blk 4, 6 mi sw Stamford, elev 1616 ft, Canyon sand 3690 ft, Palo Pinto 4225 ft, Strawn 4500 ft, flow 154 bbls 39.6-gr, 250/1, ¼-in, Canyon perf 3690-3702 ft, td 4812 ft, pb 3728 ft.

Jones County—Junked: Eason Oil Co. et al's Freeman 1, 1930 ft nsl 660 ft ewl, Henry Virm sur No. 263, jkd and abnd 1235 ft.

McCulloch County—Failure: D. H. Brock et al's Cox 1, 235 ft snl 745 ft wel of w-160 ac Fisher & Miller sur No. 2482, abnd 1003 ft.

Stephens County — Failure: Hooper-Byrne Co.-C. E. Fraser's Walker 1, 467 ft out nw cor ne TE&L sec 1310, elev 1209 ft, Bend 3303 ft, Marble Falls 3915 ft, abnd 4253 ft.

WEST CENTRAL TEXAS WILDCAT DEEPENED

Coleman County—Failure: North & South Oil Co.'s Smith 1, 2200 ft nsl 1320 ft ewl Brooks & Burleson sur No. 1, A-1430, otd 3987 ft, Ellenburger 4547 ft, abnd 4558 ft.

LOWER TEXAS COAST

Goliad County — Slick: Lyons & Prentiss' Jank 2, 725 ft fr se 330 ft fr nel ne 80-ac of se 200-ac of CEP I&M sur 9, 5½-in 7612 ft, perf 7594-98 ft, 7602-04 ft, flow 292 bbls, 5/32-in, td 7612 ft.

Jim Wells County — Seeligson: Magnolia's Seeligson 50, 15,623 ft fr el 1980 ft fr sl, A. Ramirez Gr, 7-in 6009 ft, perf 5960-65 ft, flow 120 bbls, 7/64-in, td 6209 ft.

Kleberg County—Stratton: Humble's King Ranch, Paso Ancho 32, 4750 ft fr el 4620 ft fr nl, San Gertrudis Gr, 6350-ac lse, 5½-in 7150 ft, perf 6574-82 ft, flow 124 bbls, 1/8-in, td 7170 ft.

Nueces County—Baldwin: Magnolia's Baldwin 7, 1715 ft se of nw interior cor 1418 ft w fr w'ly el 905-ac lse, BS&F sur 165, 5½-in 4056 ft, abnd 4350 ft.

LOWER TEXAS COAST WILDCATS

Jim Wells County—Failure: H. F. Wilcox Oil and Gas Co.'s Price 2, 640-ac tr I&GN sur 23, 4 mi nw Alfred, abnd 5260 ft.

San Patricio County—Failure: E. A. Graham's Barry 1, 230-ac tr, R. Martinez sur, 3 mi n Gregory, abnd 7506 ft.

SOUTHWEST TEXAS

Jim Hogg County — Colorado: Humble's King Ranch 28, 1980 ft fr nl 2640 ft fr wl AB&M sur 42, 640-ac lse, 5½-in 3072 ft, flow 64 bbls, 3/16-in, td 3081 ft.

LaSalle County—Washburn: Quintana Petroleum's South Texas Syndicate 28, 1325 ft n fr se cor H&GN sur 68, e flank, 5½-in 5533 ft, no perfs, flow 389 bbls, ¼-in, td 5550 ft.

SOUTHWEST TEXAS WILDCATS

Duval County—Failure: Argo Oil Corp.'s Braslau 2, 990 ft fr ne 2310 ft fr sel, J. Poitevent sur 137, 3065-ac lse, abnd 5202 ft.

Jim Hogg County — Failure: Texas Co.'s Yaeger 1, 1½ mi nw Armstrong field, 1100-ac lse, R. Garza sur 222, abnd 3895 ft.

SOUTH CENTRAL TEXAS WILDCATS

Gonzales County—Failure: G. W. Strake's Weber 1, 4½ mi sw Smiley, 628-ac lse, Thomas Wright sur, abnd 4804 ft.

Milam County — Failure: L. Underwood Rountree's Yoakum 1, 3 mi ne Rockdale, 50-ac tr, T. J. Chambers sur, abnd 4218 ft.

Wilson County—Failure: L. D. Ormsby's Riley 1, 122-ac lse, Joseph Reynolds sur, 7 mi ne Floresville, abnd 5210 ft.

TEXAS GULF COAST

Brazoria County—Lochridge: Grubb & Hawkins' Wood 2, 1036 ft n & 467 ft w Wood 1, 861-ac lse, Thomas Alsberry sur, 5½-in 6372 ft, perf 6358-63 ft, flow 115 bbls, 1/8-in, td 6375 ft.

Harris County—Katy: Humble's Alexander Unit 1-B, 1320 ft fr sl & 2642 ft fr el sec 79, 800-ac lse, e flank, perf & shut-in, td 7315 ft.

Jefferson County—Lovell Lake: Humble's Broussard Trust 46, go s alg el 5627 ft fr ne cor 1653-ac lse, th at ra to said 4932 ft w, C. Hillebrandt sur, perf 7717-18 ft, flow 29 bbls, 3/16-in, td 7721 ft.

Jefferson County—Stowell: Sun's McLean 1, 330 ft fr wl & 660 ft fr sl sw¼ lot 7, 160-ac lse, B. A. Vacocu Lge, abnd 8982 ft.

Waller County—Katy: Humble's Pontius 1, 1980 ft fr sl & 1980 ft fr el 480-ac lse, sec 83, blk 1, 5½-in 7191 ft, t/sand 6879 ft, perf & flowed 123 bbls 1/8-in, td 7450 ft.

TEXAS GULF COAST WILDCAT

Wharton County—Discovery: Salt Dome's Menefee 1, 3907 ft fr wl & 330 ft fr sl 223-ac tr, S. P. Middleton sur, 5½-in 4600 ft, perf 4540-50 ft, flow 2,425,000 gas, ¼-in, 1635 ft tp, 1840 cp, td 4600 ft.

EAST TEXAS

Anderson County — Cayuga: Carter-Gregg Oil Co.'s Trinity River 4, 150 ft e of e bank of Trinity River 1000 ft ne of Tide Water's

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Edens 17, directional hole, elev 260 ft, Austin 3243-3690 ft, top Woodbine 3974 ft, 50,000,000 gas, perf 4008-20 ft, td 4037 ft. (Permission for completion as gasser denied by PAW.)

Smith County—Chapel Hill: Phillips Mayfield 1, 660 ft out nw cor 121-ac tr Henry Cook sur A-188, top Woodbine 4050 ft, Georgetown 4465 ft, Glen Rose 5995 ft, massive anhydrite 7350-7595 ft, Pettit 8260 ft, Travis Peak 8503 ft, abnd 8597 ft.

EAST TEXAS WILDCATS

Franklin County—Failure: Humble's King 1, 1982 ft fr m/e/e 660 ft m/n/s lines, Wm. Y. Lacy sur, 11,500 ft nw New Hope pool, elev 370 ft, top Georgetown 4058 ft, base Goodland 5780 ft, top Paluxy 5802 ft, massive anhydrite 7258-7421 ft, Travis Peak 8068 ft, abnd 8243 ft.

Houston County — Failures: Continental's Texas Long Leaf Lumber Co. 1, 4500 ft fr m/n/ne 2700 ft fr m/n/nw lines, H. W. Bozeman sur, slim hole test, abnd 5004 ft.

Fox and Butler's Graddock 1, 330 ft out nw cor 80-ac lse, James R. Hart sur, elev 338 ft, abnd 3056 ft.

Rusk County—Failure: Texas Co.'s Christian 1, 660 ft wel 1000 ft snl of 212-ac lse, Young Settoon sur, elev 378 ft, top Georgetown 3065 ft, base Goodland 4024 ft, Paluxy 4080 ft, massive anhydrite 5730-5984 ft, James 6481 ft, Pettit 6722 ft, Travis Peak 6945 ft, abnd 7123 ft.

Van Zandt County—Failure: Sol Bronstein and Siegel's Loftis 1, 725 ft fr sw 692 ft fr se lines if 100-ac lse, Robt. Giles sur, elev 464 ft, Austin chalk 3955-4510 ft, top Sub-Clarksville 4570 ft, top Woodbine 4828 ft, abnd 4875 ft.

NORTH TEXAS

Archer County: A Kriss et al's Wilson 21-A, 770 ft nsl 250 ft ewl nw¼ S. P. Ry. sec 2, A-1203, pump 18 bbls, 1584-87 ft.

White & Duncan's Archer City 1st Nat'l Bank 1, 200 ft out se cor sec 33, blk 5, Clark-Plumb, abnd 1201 ft.

Archer County—Vogtsberger: Shell's Thorman 2, 467 ft snl 853 ft ewl ne H&TC 11, blk 1, flow 345 bbls 2-in, Strawn sand 4666-4753 ft.

Clay County: Fortex Oil Corp.'s Henderson 1, 2016 ft snl 1725 ft wel, S. Hernandez sur A-185, abnd 1200 ft.

Golden-Norwood & Bohner's Roach 1, 150 ft fr ne 450 ft fr se lines blk 4, F. Longario sur A-287, abnd 1162 ft.

Clay County—Joy: Shell's Clark 6, 330 ft wel 2331 ft nsl blk 21, H. Williams sur A-704, pump 141 bbls, shot 20 qts 3999-4019 ft.

Clay County—Stephens: Continental's Mayfield 1, 330 ft snl 1546 ft wel 89.8-ac lse, G. W. S. Tipps sur A-449, Mississippi 6098 ft, Simpson 6363 ft, Ellenburger 6535 ft, abnd 6720 ft.

Cooke County: Benson Bros. et al's Fleitman 2, 2786 ft nsl 1667 ft wel, A. Patterson sur A-817, pump 12 bbls, broken sand 1038-49 ft.

Cooke County — Walnut Bend: Sinclair Prairie's Ramsey 16, 652 ft fr m/e/e 791 ft fr m/n/s lines of 400-ac lse, C. Furinash sur, Winger 5487 ft, Simpson 5508 ft, flow 1032 bbls 1-in, perf 5490-5513 ft, td 5585 ft.

Magnolia's McGeorge 4, 330 ft snl 585 ft ewl sec 66, Fannin CSL, elev 762 ft, top Winger 5597 ft, abnd 5918 ft.

Jack County—Hoefle: Hanlon & Buchanan's Leach 2, 1485 ft out ne cor of w-236½-ac, John S. Porter sur, abnd 5199 ft.

Montague County—Hildreth: Continental's Middleton-Gadberry 1, 177 ft nsl 717 ft wel E. T. Ry. sec 53, Bend 6046, flow 1349 bbls, ½-in, perf 6098-6138 ft, td 6400 ft.

Montague County — Mueller: Continental's Richardson 2, 890 ft fr nw 337 ft fr ne lines sec 97, Hill CSL sur, Bend 6028 ft, flow 1121 bbls 42-gr, ½-in, perforations lime 6038-48 ft, td 6190 ft.

Wichita County: Culbertson Co.'s Waggoner Bros. 94, 1480 ft nsl 1690 ft ewl BS&F 13, A-394, pump 5 bbls 649-54 ft, td 661 ft.

Grace & Grace's Dunn 1, 150 ft nsl 3150 ft ewl, W. H. Anderson sur A-1, pump 10 bbls, 412-25 ft, td 450 ft.

Coppock & Coleman's Hoge 11, 330 ft out nw cor e-80 ac of blk 39, KWVFL, abnd 1813 ft.

Whitaker & Carter's Hoge 2, 990 ft snl 1320 ft ewl blk 38, KWVFL, pump 6 bbls oil 8 bbls wtr, 1765-72 ft.

NORTH TEXAS WILDCATS

Archer County—Discovery: Geo. W. Cooper et al's J. R. Parkey 1, ne se se S. P. Ry. sec 1, A-419, elev 1060 ft, KMA lime 4094 ft, pump 95 bbls 39-gr, Strawn sand 4331-51 ft.

Archer County—Failures: A. R. Dillard et al's Wilson-McCrory 1-T, c ne ne ATNCL sec 111, Bend 4860 ft, Mississippi 5092 ft, Ellenburger 5181 ft, abnd 5354 ft.

Pois & Schultz's Sadau 1, 2790 ft snl 1250 ft wel, Geo. Stell sur A-382, abnd 1503 ft.

Clay County—Failure: L. T. Burns et al's J. Gilbert 1, 1650 ft snl 1000 ft wel, G. F. Bridgeman sur A-40, Bend 5537 ft, abnd 6278 ft.

Cooke County—Failures: Bridwell Oil Co.'s E. R. Campbell 1, 1100 ft e 600 ft n of m/w/sw cor, H. Williams sur A-1087, Ellenburger 1466 ft, abnd 1500 ft.

Burk Royalty Co. et al's Holcomb 1, 330 ft out sw cor of 56-ac tr, A. C. C. Bailey sur A-44, Ellenburger 4138 ft, abnd 4302 ft.

Montague County—Failure: Mid-Continent's Freeman 1, 447 ft nsl 660 ft ewl blk 20, J. Y. Castello sur, Bend 5364 ft, Simpson 5621 ft, Ellenburger 5855 ft, abnd 5893 ft.

Wilbarger County—Failure: W. T. Rogers Jr et al's Waggoner Est. 2, 750 ft snl 2300 ft wel H&TC 40, blk 4, abnd 1947 ft.

TEXAS PANHANDLE

Carson County: Skelly's Schafer 171, 1320 ft snl 440 ft wel nw I&GN 197, blk 3, pump 101 bbls, shot 520 qts 3015-3120 ft.

Skelly's Schafer 173, 440 ft snl 1320 ft wel ne I&GN 197, blk 3, flow 981 bbls, shot 620 qts 3026-3115 ft.

Gray County: Cities Service's Heitholt 3, ne nw ne I&GN 152, blk 3, pump 105 bbls, shot 195 qts 3151-3283 ft.

Phillips' Castleberry-Pan 2-B, 330 ft out se cor n-80 of w-100 ac of n½ I&GN 151, blk 3, pump 129 bbls, shot 320 qts 3159-3271 ft.

United States Wildcat Starts

ARKANSAS

Columbia County: Frank and George Frankel's Ulma Edwards 1, c se sw 16-17-21, lcn.

Nevada County: Magnolia's Lester A-1, c ne sw 36-14-20, lcn.

CALIFORNIA

Fresno County: Shell's San Joaquin 2-1, c se ne 9-15-17, nwly Raisin City area, lcn.

Glenn County: General Petroleum Corp.'s Orland Comm. 1, c nw nw 11-21-3, Orland area, lcn.

Kern County: G. C. Nelson's N. H. 1, se nw 36-26-27, Mount Poso area, lcn.

Dwight G. Vedder's 1-34, sw nw sw 34-26-27, Mount Poso area, rig.

Signal Petroleum Co.'s S.P. 1, sw nw nw 25-28-28, Round Mountain area, lcn.

Western Gulf Oil Co.'s KCL-A 37-14, nw se sw 14-29-26, Rosedale area, mim.

Ventura County: Joseph Shuck's 1, Rancho Calleguas, 28-2-20, Camarillo area, lcn.

ILLINOIS

Bond County: T. N. Conray's Foreman 1, se sw sw 18-4n-3w, dr.

Effingham County: A. J. Hammer's Ruskin 1, se ne se 4-7n-6e, dr.

Ford County: Herndon Drlg. Co.'s W. J. Fecht 1, se se sw 33-26n-9e, lcn.

Franklin County: Bell & Zoeller Coal & Mining Co.'s Ziegler Coal & Coke Co 4, nw sw 12-7s-1e, lcn.

Jefferson County: Dickerson & Leibernecht's Minor 1, se se sw 3-2s-3e, lcn.

Sangamon County: C. H. Davis' J. W. Taft 1, n½ se ne 15-15n-3w, dr.

White County: Jarvis Bros. & Marcell's G. Pallman 1, nw ne ne 26-3s-10e, dr.

INDIANA

Gibson County: W. H. Bears' A. Thompson 1, ne sw sw 11-3s-12w, lcn.

Spencer County: C. V. Guthrie's Chris Smith 1, se sw ne 32-6s-5w, lcn.

KANSAS

Barton County: D. C. Luse's Fee 1, ne ne sw 21-20s-13w, lcn.

Ellis County: R. C. Tafrent's P. Brungardt 1, n½ se sw 27-15s-17w, spud.

Ellsworth County: Benson Drlg. Co.'s Morevak 1, sw sw nw 22-15s-10w, c&p.

Jackson County: McLaughlin's James 1, c se ne 24-8s-15e, rum.

Marion County: N. Appleman et al's Garrett 1, ne sw 29-18s-1e, pits.

Morris County: Dr. Franks et al's Nelson 1, c se sw 6-15s-7e, dr 1564 ft.

Rooks County: Bridgeport Oil's Matheson 1, c se sw 6-8s-20w, rur.

Stafford County: Shell et al's Wolf 1, nw nw nw 7-22s-11w, lcn.

Skelly's H. W. Landreth 1, se se ne 33-24s-14w, dk.

KENTUCKY

Daviess County: White & Coffey's W. Powers 3 (5), 20-O-32, lcn.

Todd County: A. A. Peard et al's Nobb Bros. 1, 19-C-29, dr.

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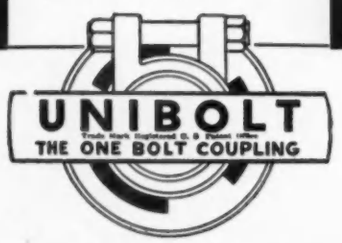

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SOUTH LOUISIANA

Vermilion Parish: Union Oil Co.'s Louisiana Furs 2-C, Freshwater Bayou area, start se cor T-15s-1e, go s 17° 30 mins e 17,323 ft, thence s 55° 30 mins e 100 ft in sec 31-16s-2e, lcn 12,000-ft test.

NEW MEXICO

Eddy County: Bay Pet. Corp.'s Leonard 1, ne ne nw 33-17s-29e, lcn.

Danciger Oil & Refineries' Friess 1, c nw ne 30-17s-31e, lcn.

Neil H. Wills et al's Zorichak 2, c se nw 5-20s-31e, lcn.

Lea County: Skelly's State 1-V, c ne se 7-22s-35e, lcn.

OKLAHOMA

Creek County: L. B. Jackson's Berryman 1, se sw ne 11-18n-10e, cable tools.

Hughes County: Deep Rock's Lela Fexico 1, nw ne sw 1-6n-10e, lcn.

Lincoln County: Flynn Oil Co.'s Hubble 1, c sw ne 5-12n-4e, spud, 10-in at 88 ft, shut down.

Fain-Porter Drlg. Co.'s McVicker 1, ne ne sw 8-15n-5e, dr 2210 ft.

Noble County: Big Chief et al's Green 1, ne ne se 19-20n-1w, Oread 2690 ft, dr 3376 ft.

Payne County: Texas Co.'s Gunkel 1, nw sw ne 9-17n-1e, Paw 1880 ft, Avant 3020 ft, dr 3646 ft.

O. A. Walters' Buckanan 1, se nw nw 6-18n-1w, lcn.

Olean Pet. Co.'s Wheeler 1, ne ne sw 15-19n-1w, dr 70 ft.

Sun's Morgan 1, ne ne sw 10-19n-5e, 140 ft, woc.

Ace Gutowsky's Foche 1, se sw se 2-20n-4e, lcn.

Robert H. Burns' Anderson 1, c sw sw 2-20n-3e, material.

Pottawatomie County: W. J. Sherry's Friends Church 1, nw nw nw 6-9n-4e, dk.

Seminole County: B & M Drlg. Co.'s Mathis 1, se se sw 6-6n-6e, Belle City 830 ft, dr 2110 ft.

WEST TEXAS

Hudspeth County: John C. Rogers et al's J. W. Tidwell 1, 150 ft n 50 ft e of c of nw se PSL 19, blk 74, lcn 3000-ft test.

Lynn County: Sohio Producing Co.'s S. A. Allsup-Honolulu 1, c se nw E. L. R. 113, blk 12, set surface pipe.

Pecos County: Phillips' Pascoe 1, c se nw H&GN 114, blk 11, lcn for Ellenburger test.

WEST CENTRAL TEXAS

Jones County: O. P. Leonard et al's H. A. Snively 1, se se sw T&P 45, blk 14, lcn 1900-ft test.

Palo Pinto County: W. K. Gordon et al's J. Holub 1, 1320 ft sni 330 ft ewl T&P Ry. 71, blk 2, lcn 3800-ft cable test.

LOWER TEXAS COAST

Brooks County: Alfred Morrison's Hocker 1, Palo Blanco area, 1200 ft fr nw 467 ft fr nl sec 69, Las Megueyes de Palo Blanco Gr, lcn 3200-ft test.

Goliad County: Guy Green's Huggins 1, 4200 ft fr most s'ly nl 6630 ft fr most w'ly wl 5049-ac tr, Maria de Jesus Ybarbo sur, 4 mi e Goliad, lcn 4500-ft Vicksburg test.

Jim Wells County: H. F. Wilcox Oil & Gas Co.'s Almond 1, 467 ft fr nw 1600 ft fr sl, SA&MG sur 13, 986-ac lse, lcn 5100-ft test.

Nueces County: Hewit & Dougherty's Dodson 1, Bluntzer area, 402-ac lse, share 8, 7 mi e Orange Grove, rig up.

SOUTHWEST TEXAS

Duval County: Continental's Welder 1, 2 mi sw Seven Sisters field, 330 ft fr nl 1320 ft fr wl, J. Poitevent sur 211, lcn 3000-ft test.

M. E. Davis' Southland Life Insurance 1, 660 ft fr n&wl sec 2, Ball Rch Santos Flores Gr, lcn 6000-ft test.

Jim Hogg County: Massingill & Spice's Palacios 1, 330 ft fr n&el blk 5, W. Waddell sur 232, 2140-ac blk, lcn.

Texas Co.'s Yaeger 2, 1320 ft fr el & 330 ft fr nl, R. Garza sur 222, 1100-ac lse, 9000 ft nw Armstrong field discovery, lcn 5000-ft test.

SOUTH CENTRAL TEXAS

Travis County: J. E. Schultz' Swenson 3, 103-ac lse, L. Kimbro sur, 7 mi w Elgin, lcn 700-ft test.

TEXAS GULF COAST

Chambers County: Wynn Crosby Drilling Co.'s Mayes 1, 40-ac unit in nw cor Robert Oliver sur, 1 mi sw Jackson Pasture disc, lcn 10,500-ft test.

Jefferson County: Glenn H. McCarthy's Matheis 1, 50-ac tr Koch subdvn, Valmore sur, nw Stowell field, lcn 10,000-ft test.

Matagorda County: Texas Co.'s Hamill 3, 2350 ft n of nearest point on creek, 11,082-ac lse, William Baxter sur, lcn 14,000-ft test.

Montgomery County: Atlantic Refining Co.'s South Texas Development 1, Conroe field area, 40-ac unit Security subdvn, C. Beach sur, lot 66, lcn 12,000-ft Wilcox test.

EAST TEXAS

Kaufman County: M. J. Delaney Co.'s J. M. Rutledge 1, 550 ft fr ne 600 ft fr nw lines of 200-ac tr, E. Parsons sur, twin to Sun's Smackover failure, lcn 700-ft test.

Rains County: C. H. Marshall, tr. Central Pipe Line Co.'s O. L. Gaston 1, 330 ft out of se cor of 229-ac tr, James Garrett sur A-97, lcn for Paluxy test.

Wood County: Roeser-Pendleton's Dabney White 1, 600 ft sni 1980 ft wel 57.4-ac tract, T. J. Griffin sur, Paluxy test, dr 800 ft.

NORTH TEXAS

Archer County: M. W. Blair Oil Co.'s H. O. Prideaux 1, 550 ft nsl 150 ft wel, F. Saunders sur A-855, lcn 750-ft test.

Cochran & Cain's H. Forester 1, 330 ft out sw cor blk 46, Harris Club subdiv, lcn 2000-ft test.

H. D. Egger et al's C. Cowan 1, 330 ft out

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Is the driller's best friend because it makes the easiest brake known and "feeds off" evenly while drilling. It never scores brake rims. See page 2257 Composite Catalog.

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nw cor blk 84, Jefferson CSL sur, lcn 1200-ft test.

Panhandle Refg. Co.'s L. F. Wilson 1, nw nw se ATNCL sec 99, lcn 5500-ft Ellenburger test.

Cooke County: Bridwell Oil Co.'s W. H. & Louise Campbell 3, 710 ft snl 1150 ft wel, O. F. Leverett sur A-607, lcn.

Haskell County: Hunter - Hunter & Sohio Producing Co.'s M. J. Wood 1, 3000 ft snl 6250 ft wel, L. Dyches sur No. 46, A-118, lcn 3600-ft test.

Jack County: Hanlon & Buchanan's Johnson Bros. 1-E, 200 ft e of sw cor, C. Vandiver sur A-868, in Wm. Thompson sur A-608, lcn 6000-ft test.

Jack Pot Oil Co.'s J. M. Bloodworth 1, 6700 ft nsl 4649 ft wel, J. B. Irvine sur A-312, lcn 6000-ft test.

G. E. Kadane & Sons' W. M. Shields 1, 330 ft out ne cor, M. Dameron sur A-193, lcn 6000-ft test.

R. W. Darden et al's J. C. Lindsey 1, 3200 ft nsl 2214 ft ewl, I. N. Wright sur A-898, lcn 3500-ft test.

Standard of Texas-Hanlon & Buchanan's Mrs. T. M. Jackson 1, 347 ft fr sel 880 ft fr swl J. Crowley sur A-1602, lcn 4000-ft test.

You may have surplus equipment that is urgently needed by some other operator. See the

TRADING POST SECTION

(Page 78 of This Issue)

Squeaks from the Bull Wheel

Reasons Enough

A doctor who had taken up as his specialty the treatment of skin diseases was asked by a friend how he happened to select that particular branch of medicine.

"There were three perfectly good reasons," replied the physician. "My patients never get me out of bed at night, they never die and they never get well."

Grief Under Difficulty

A drill sergeant, whose extreme severity had not exactly endeared him to his men, was putting a squad of rookies through the funeral exercises.

Opening ranks, so as to admit the passage of the cortege between them, the sergeant walked down the lane thus formed, saying as he did: "Now I am the honored dead. See that you do the proper thing. Attention!"

At the end of the lane he turned around, scrutinized the squad with a practiced eye, and then remarked, "Your hands is right, your heads is right, but you haven't got that look of regret you ought to have!"

The Epistle to the Corinthians
(With Apologies to St. Paul)

Though I speak with the tongues of men and of angels, and have no Priorities, I am become as sounding brass or a tinkling cymbal.

And though I have the gift of prophecy, and understand all mysteries, and all knowledge, and have no Priorities, I am nothing.

And though I cover acres with plants and machines, and have no Priorities it profiteth me nothing.

A Blanket Priority puffeth up: An A-1 is most seemly, and causeth joy.

An A-10 giveth food to the hungry, and the wise men sneezeth not at even a B.

An owner of an A-A beareth all things, believeth all things, hopeth all things, endureth all things.

For an A-1-A never faileth, but without it all things fail; and whether there be orders they shall cease, and whether there be profits they shall vanish away.

For now we see through a glass darkly, but an A-1 shineth brightly, and all men shall say: Lo, he is favored.

There remaineth these things, Faith, Hope and Priority, but the greatest of these is Priority.

Ideal

(Two college presidents discussing what they'd like to do when they retired.)

1st President: "I'd like to be the superintendent of an orphan asylum, so I'd never get any letters from parents."

2nd President: "Well, I've got a much better ambition. I want to be a warden of a penitentiary. The alumni never come back for a visit."

Proposal

"Jim proposed to me last night and I'm sore at him."

"What makes you so mad?"

"You ought to have heard what he proposed."

Needed Help

A bishop attended a banquet and a clumsy waiter dropped a plate of hot soup in his lap. The clergyman glanced around with a look of agony and exclaimed:

"Will some layman please say something appropriate?"

Elation

"See how the bride is blushing?"

"Blushing, nothing. That's the first sign of victory."

The Other Angle

"If you refuse me, Irma, I shall never love another."

"That last part is Oke with me, but what I want to know is, will it hold good if I accept you?"

Substitute

"Who was that physical wreck I saw you with last night?"

"Oh, I call him Ersatz. He's a substitute till Bill licks the Germans and the Japs and comes home again."

Demonstration

First Girl: "What's a military objective?"

Second Ditto: "Just walk past those soldiers on the corner and you'll find out."

No Use Choosing

"Which would you advise me to marry, a brilliant woman, or a beautiful woman?"

"Well, it's hard to say. A brilliant woman should know better. But on the other hand, a beautiful woman could do better."

"Now, if we were only staying at THE ROOSEVELT"

When you stop at The Roosevelt you don't risk getting marooned like this. For you'll be within walking range of Manhattan's Midtown activities. Direct passageway from Grand Central Terminal to hotel lobby. A reservation at The Roosevelt liquidates a lot of bother. ***Rooms with bath from $4.50.***

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Robert P. Williford, General Manager

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OIL AND GAS LEASE

U. S. DEPARTMENT OF AGRICULTURE. Farm Security Administration, Dallas, Texas. Separate sealed bids, in triplicate, will be received until 2:00 o'clock P.M. (cwt), Monday, January 3, 1944, and then publicly opened, offering bonus for operating rights in connection with oil and gas leases on two tracts of land, Garvin County, Oklahoma—Tract 1—containing 307.23 acres and Tract 2—70 acres, in which the Government owns a three-eighths interest in the mineral rights. Award of lease will be made to bidder who can show sufficient experience and financial resources and prove citizenship. Interested parties may obtain bid documents, lease forms and operating regulations from the office of the Regional Business Manager, Farm Security Administration, Parry Avenue at Commerce, Dallas, Texas.

Notes for the Equipment Buyer and User

Heavy-Duty Hydraulic Jack

TEMPLETON, KENLY & COMPANY

Templeton, Kenly & Company, Chicago, has developed a tandem-pump, hydraulic jack, in 30- and 50-ton size, for moving heavier weights faster, especially in localities where cranes are not available.

These powerful hydraulic jacks have high and low speed pumps and the pumps can be operated singly or in unison.

The base is made of special analysis solid steel bar stock which adds to the load bearing security. The jacks have two release valves located on opposite sides of the base for the convenience of the operator. Either release screw controls ram return. The easy carrying grip is an integral part of the high speed pump.

Two men can carry the jack by inserting the jack lever through the pump handle sockets.

The jack comes in two models: Model 30HJ, capacity 30-tons; low height 11 inches; hydraulic lift 7 inches; weight 65 pounds. Model 50HJ, capacity 50-tons; low height, 12 inches; hydraulic lift 7 inches; weight 115 pounds.

Two-In-One Dirt Moving Unit

BUCYRUS-ERIE COMPANY

Bucyrus-Erie Company, South Milwaukee, Wisconsin, has recently developed the Dozershovel for T9 and TD9 International TracTracTors. This two-in-one dirt moving unit provides for tractor shovel and bulldozer service with simple interchangeability of bucket and blade, permitting in-the-field changeovers in a few minutes.

As a shovel, the hydraulic control provides down pressure up to 4200 pounds for real digging "bites" and big pay loads in a short distance of travel. The same control on the bulldozer provides easy penetration in hard materials and ability to hold the cut. Strong side arms permit the shovel to lift big loads, the dozer to handle any dirt-dozing job. The dumping trip-mechanism gives the dozer ability to tip the blade forward to release the load on uphill dozing.

Bucyrus-Erie Dirt Machine

Other features include unobstructed visibility, low overhead clearance, oscillating tracks for quick, high lift.

Visibility without "blind spots" permits accurate dumping and reduces operator fatigue besides increasing the unit's exceptional maneuverability and speed. Its traveling height of 8' 1½" allows it to get in and out of buildings, to work in close quarters, to be transported on trailers, eliminating unnecessary route-planning to avoid underpasses. It has oscillating tracks for stability on uneven ground, and high lift for fast work in loading trucks.

An additional feature is the standard hook on the upper edge of the shovel bucket or dozer blade, giving the unit a third application; lifting crane service. This is especially handy in loading or unloading the extra blade or bucket from the truck.

The changeover itself requires only simple operations: removing five pins holding the bucket, trip latch, and limit chains; setting dozer blade or shovel bucket in place; and replacing pins.

Simplex Heavy-Duty Jack

Balancing Engines

Clark Bros. Company, Olean, New York, has issued a bulletin which summarizes information on the balancing of gas and oil engines, R. C. Engelman and T. J. Chrzan are the authors.

Hole Cutting Tool

ROBERT H. CLARK COMPANY

Robert H. Clark Company, 3424 Sunset Boulevard, Los Angeles 26, California, is supplementing its line of adjustable cutting tools with the new Clark Fly cutter for cutting holes in discs in metals of thicknesses up to one inch, including boiler plate, stainless steel, cast iron, plastics, or any other "problem" materials. Because of its wide range in cutting, this tool is particularly adaptable to oil-field machine shops.

Features of the cutter include generous clearance between work and the body of the cutter, assuring deeper cuts with less strain on the tool, and the use of new cutting technique which eliminates chatter and assures clean holes.

The tool is obtainable with straight or tapered shank and covers expansions of four inches to 10 inches in diameter, including all decimal or fractional intermediate sizes.

With this addition to the line of cutters, the company has provided tools for cutting holes from 5/8-inch to 10 inches in diameter and straight side discs from four inches to 10 inches in diameter. Models for cutting diameters from 5/8-inch to five inches, and for cutting holes in pipe and carved surfaces, have three cutting blades. Those for cutting diameters from four inches to 10 inches are the 2-blade type.

Bits for this line of tools can be reground or can be replaced with new ones at comparatively small cost.

Fairbanks, Morse Announces Personnel Changes

Changes in personnel have recently been announced by Fairbanks, Morse & Company, Chicago, as follows:

O. O. Lewis, formerly branch manager at Atlanta, has been promoted to assistant general sales manager at Chicago.

V. O. Harkness, former manager at Dallas, has been appointed manager of the diesel engine sales division, Chicago.

H. J. Renken, former manager of the oil field division at Dallas, has now been made branch house manager at Dallas, where he will also continue to serve as manager of the oil field division in connection with his new duties.

G. N. Van Epps, formerly manager of the diesel department, Chicago branch, has been promoted to manager of the branch at Atlanta.

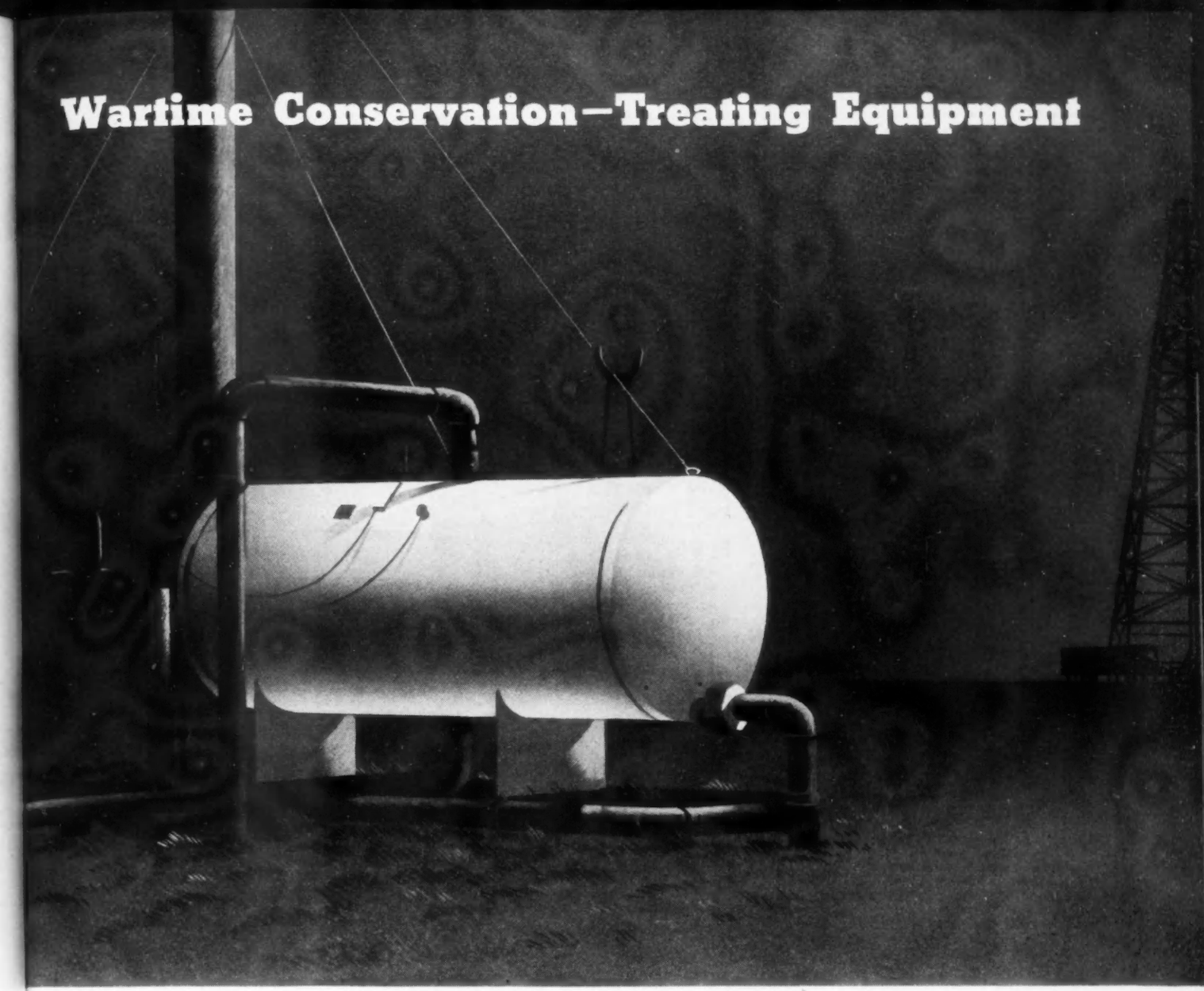
Thornhill-Craver Company Rebuilding Machine Shop

Thornhill-Craver Company, Houston, has let contract for a $25,000 building to replace its machine shop, recently destroyed by fire.

Sheet and Plate Steel

Jessop Steel Company, Washington, Pennsylvania, has published a new catalog, which includes information on analyses, applications, manufacture, fabrication, styles of heads and standard size of sheets and plates. It also gives an explanation of the assembly method used in producing Jessop Stainless-Clad.

Wartime Conservation—Treating Equipment



Information supplied by "Oil Weekly"

Intermittent flowing of wells where proration or pipe-line restrictions prevent daily operation involves the provision of multiple units for oil treatment or for periodic chores such as the freeing of flow lines from choking paraffin deposits. Such units, standing idle much of the time, represent sizeable quantities of steel, pipe, valves, regulators and other priority-restricted equipment.

By mounting such a unit as a paraffin heater or separator on skids, and equipping it with standardized inlet, outlet and fuel connections which will tie in with a minimum of effort to any of the wells or flow lines on the lease, it is possible to schedule the round of such a unitized set-up so that it may actually be in continuous operation except while being transferred between points of demand.

Such unitization and mobilization of the equipment will enable one unit to accomplish all that would normally be expected from several without loss of production, efficiency or effectiveness. Also, such a portable unit, in case of breakdown or failure, may be repaired away from the well or tank battery.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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OIL WELL IMPROVEMENTS CO.

SINCE 1912

TULSA, OKLAHOMA

Men in the Industry's News

J. A. MULL, geologist, and J. W. Collins, landman for Superior Oil Company of California, are in charge of the newly opened offices of the firm in Oklahoma City. Both men transferred from Wichita.

FRANK PORTER of Pain-Porter Drilling Company, has been elected president of the Kansas-Oklahoma Division of Mid-Continent Oil and Gas Association.

STUART E. YEATON has been made manager of sales of the electrical wire and cable division of John A. Roebling's Son's Company, Trenton, New Jersey. Subsequent to his graduation from the University of Washington he was employed as a salesman in the Seattle Branch from 1934 to 1941, at which time he was made assistant to W. G. Marks, president of the California corporation of the Roebling Company at San Francisco. In May, 1943, he was transferred to the main office at Trenton as manager of sales of round, flat wire and specialties. He assumed his new position on December 1st.

D. M. HAMMETT, vice president of Axelson Manufacturing Company, died November 30 at his home in Whittier, California. Already known in oil circles, he joined Axelson Manufacturing Company in 1922 as a salesman. In 1927 he was made Mid-Continent sales manager, and in 1933 was elected vice president of the company. His office was in Tulsa until 1939 when he was transferred to the Los Angeles plant.

LIEUTENANT LARRY N. SUCCOP, former sales representative of American Roller Bearing Company throughout the Southwest, was killed in action October 17, in the New Guinea area, while flying a fighter plane with the Fifth Air Force. He had been on active combat duty for 13 months in the Pacific Campaign and had been decorated five times, receiving the Air Medal, one Oak Leaf Cluster, the Distinguished Flying Cross, and two Oak Leaf Clusters. He was a graduate of Shadyside Academy, Yale University and Carnegie Tech.

BO BARDSLEY has joined Perrault Brothers, Tulsa, as partner and manager of their pipe line supply division. Bardsley has been a long time resident of Tulsa and has been engaged in the pipe line supply business for the past 19 years.

C. J. Dexter Heads New Mexico Association

C. J. Dexter was reelected president of the New Mexico Oil and Gas Association at its fifteenth annual meeting at Artesia, December 1. Other officers include Van S. Welch, vice president; Harry Leonard, treasurer; and Hugh L. Sawyers, secretary; in addition the following were reelected to the executive committee: M. E. Baish, Emery Carper, Dan Bodie, J. N. Dunlavey, F. J. Danglade, and J. S. Griffith.

"Post-War Taxation" was discussed by Rupert F. Asplund of Santa Fe, director of the Taxpayers' Association of New Mexico. Foster Morrell of Roswell, Assistant Supervisor, United States Geological Survey, spoke on "The Utilization of Oil and Gas Leases on Public Lands." Other talks were given by John M. Kelly of Santa Fe, state geologist and secretary of the New Mexico Oil Conservation Commission, on "The State's Attitude on Conservation and Unitization"; and Hugh L. Sawyers, executive secretary of the association, on "The Activities of the Association During the Year."

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